M0150040
Task ID# 2508
cc: Paul, Susan

Miracle Rock Mining & Research

Rockland Mine

R647-4-106: Operation Plan

Replace page 6

commences at the Rockland Mine, these materials (rock, subsoil, topsoil) will be utilized for backfilling the highwall. Special placement sequences of these materials are addressed in the Reclamation Plan. Refer to Section R647-4-110.5 Soil Redistribution and Revegetation prior to moving these materials.

R647-4-106.7 Vegetation

The Rockland Mine disturbed area covers approximately 5.82 acres. Prior to disturbance, the native vegetation of the mine and surrounding area consisted of trees, shrubs and grasses. Tree varieties consist of pinions (*Pinus edulis*) and Utah junipers (*Juniperus osteosperma*). A diverse shrub community exists in the area with the major types being black sagebrush (*Artemisia nova*), shadscale (*Atriplex confertifolia*), fourwing saltbrush (*A. canesens*), and galleta (*Hilaria jamesii*). Grasses typical of the area include salina wildrye (*Leymus salinus*), and Indian ricegrass (*Oryzopsis hymenoides*).

A vegetation survey was conducted on an undisturbed area adjacent to the mine site. Twenty transects were evaluated using an ocular method (line intercept method) for estimating percent cover by type. Types recorded are living cover, litter, rock cover, and bare ground. Living cover is broken into two components; understory and canopy cover.

Results of the survey found an understory cover of only 2.7% and canopy of 24.3%. Canopy consisted of pinyon pine and Utah juniper cover. Litter averaged only 1% of the total cover, while no rock or rock fragments were found in the study area. Bare ground averaged 63% of the total area. A spreadsheet of the vegetation survey is found in Appendix E. Based on the results of the vegetation survey, revegetation must achieve a success standard of 70% of the pre-mining vegetative ground cover or ~~19.6%~~ 18.9%.

R647-4-106.8 Geology

As mentioned above, the Rockland is located stratigraphically in the Upper Cretaceous Ferron Sandstone Member of the Mancos Shale. The topographic setting consists of massive beds of very fine- to fine-grained sandstone, carbonaceous shale, coal, mudstone, and siltstone. Outcrops of the Ferron Aquifer exist near the area of the Rockland Mine. The potentiometric surface of the aquifer, however, indicates that recharge comes from the Wasatch Plateau to the west (UGS Bulletin #132, 2003).

The mine site lies approximately 500 feet above the Quitchupah and Muddy Creek drainages. These deep drainage systems form the boundary of the outcropping aquifer. No ground water wells exist in the area. The surface drainage system of the Rockland Mine area is confined exclusively to the Muddy Creek drainage system. Any precipitation that falls on the mine site reports to ephemeral drainages and eventually to this system.

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Rockland Mine

R647-4-107: Operation Practices

Replace page 2-3

Disturbed Area 1 (DA-1)

The mine pad area consists of hydrologic area DA-1. Its size is approximately 3.4 acres. All flow is confined to the pad and impoundment area. Any precipitation that falls onto the mine pad either puddles or flows as indicated by the flow lines on Map R107-1A. Runoff volumes have been calculated for the pad area using a 10 year/24 hour precipitation event of 1.51 inches. Peak discharge from the pad is 0.15 ac/ft.

Disturbed Area 2 (DA-2)

The area below the mine pad where material has been cast off the side slope consists of the hydrologic area DA-2. The material consists mainly of pebble to boulder sized rock and is highly permeable. No erosional effects have been indicated on the surface of these slopes. BMP's will not be used at the toe of the slope until final reclamation.

Undisturbed Drainage (UD-1)

Flow from the mine pad flows into the impoundment located on the east side of the pad. Discharge from the impoundment is treated before flowing into UD-1. Drainage UD-1 drains into an un-named ephemeral drainage which eventually flows into the Muddy River.

Undisturbed Drainage (UD-2)

Overland flows (if any) from the mine pad slopes drain into UD-2. This undisturbed drainage flows directly into the Muddy River drainage system.

Undisturbed Diversion (UD-3)

Ditch UD-3 is a historic diversion ditch that was cut with a bulldozer along an existing road above the mine site. This ditch diverts undisturbed runoff away from the topsoil storage area and directs flow into a natural drainage system. The natural drainage, like others in the area, are ephemeral and flow as a result of precipitation events.

R547-4-107.3 Erosion Control

Sediment control measures have been implemented on the disturbed area to minimize additional contributions of sediment solids to the receiving drainage. Best management practices are used to control erosion and sedimentation from mining operations. BMP's include some of the following controls; berms, impoundments (refer to photos), straw bales, silt fences, etc. Surface water quality will be protected by handling earth materials and runoff in a manner that minimizes the potential for pollution. Locations of sediment control practices are shown on the Drainage Control Map (Map R107-1A) in the Maps Section. Specifications for BMP installation are detailed in the tabbed BMP Section.

The Rockland Mine has submitted a Notice of Intent (NOI) to the Division of Water Quality to comply with the requirements of the Clean Water Act. This NOI permits the site to discharge storm water associated with their industrial activity into the waters of the United States. As part of this permit, a Storm Water Pollution Prevention Plan (SWPPP) has been developed for the site. ~~Since the mine site is rarely occupied, the SWPPP is kept at the Miracle Rock Mining and~~

~~Research offices located at 400 South 200 East, Emery, Utah.~~ Refer to Appendix F for review of this plan.

Analysis of the stored overburden samples tested has shown that toxic materials are present on-site (refer to Appendix D for soil sample results). Discharges if any, of water from areas disturbed by mining and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for mineral mining promulgated by the EPA set forth in 40CFR Part 434.

R647-4-107.4 Deleterious Materials

All deleterious or potentially deleterious materials shall be safely removed from the site or kept in an isolated condition such that adverse environmental effects are eliminated or controlled. Best management practices (BMP's) will be used to minimize contact of materials with rainfall and runoff. BMP's may be structural or non-structural controls that reduce or eliminate pollutants in storm water runoff.

R647-4-107.5 Soils

As mentioned above, soils, including topsoil and subsoil, are removed, segregated, and stored in a stable condition so that they may be used for reclamation. Storage locations are identified on the Surface Facilities Map (Map R106-1A) in the Maps Section.

R647-4-107.6 Concurrent Reclamation

Occasionally, during operations, disturbed areas may be reclaimed when no longer needed. All areas which have been disturbed but are not routinely or currently utilized will be kept in a safe and environmentally stable condition. Contemporaneous reclamation will comply with the plans outlined in R647-4-110 and R647-4-111. As these areas are reclaimed, the area reclaimed will be outlined on a map and reported to the Division.

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Rockland Mine

R647-4-109: Impact Assessment

Replace page 2

overburden is eight to 12 feet of mineral product. Highwall failure has not been a problem in the past because no groundwater exists in the area of mining and the rock mass of the overburden is structurally sound.

Rockfall problems have been managed utilizing scaling method to remove potential fall areas. Scaling is conducted immediately after blasting activities and the removal of the overburden. Scaling is completed using track-hoe bucket removing all loose rock material. No undercutting of the mineral product will occur. In the occurrence highwall stability becomes a problem, slope geometry modification and/or benching methods may be necessary. Approval by the Division will be required prior utilizing methods other than scaling.

Erosion

Erosion and sediment control practices have been previously addressed in R647-4-107 Operation Practices. A Storm Water Pollution Prevention Plan (SWPPP) as required by the Division of Water Quality is maintained at the owner's main office in Emery, Utah. A copy of this document is also found in Appendix F.

Air Quality

Impacts to air quality resources due to mining and reclamation operations are considered temporary. Emissions realized on the mine site are from equipment, blasting, loading and hauling operations. There are no permitting requirements required by the Division of Air Quality for this mining operation.

Public Safety

Public safety issues have been addressed at the Rockland Mine. There is only one access road into the mine site from Emery County Road 915. The mine entrance has been gated and is locked when idled to prevent public access into the mine site. A sign identifying the phrase, "NO TRESSPASSING" is installed on the locked gate.

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Rockland Mine

R647-4-110: Reclamation Plan

Replace pages 4-7

Impoundment Removal

One impoundment exists within the disturbed area of the site. This impoundment is located mid-way and along the south side of the access road. The impoundment measures approximately 15 feet in diameter by 3 feet deep. This impoundment has been constructed to treat runoff from the mine pad area and a portion of the access road area. During road reclamation, the impoundment will be reclaimed to compliment the topography of the surrounding area. The contour of the regraded area will be identical to the adjacent undisturbed area.

Drainage from the impoundment was routed along the side of the road to a natural drainage approximately 700 feet away. This area will be reclaimed as part of the road reclamation and no other drainage will be constructed.

Erosion control will be provided using deep gouging techniques. Deep gouges are constructed to retain moisture, minimize erosion and create and enhance wildlife habitat.

The entire area will be reseeded with the approved seed mix in Table 2.

Drainage and Natural Drainage Development

There are two small natural ephermal drainages that will passes through the disturbed area. The first ~~One~~ drainage passes under the access road near the mine gate and is approximately 20 feet in length. This drainage will be reclaimed by first removing the culvert. The reestablishment of this small section will be constructed to match the upstream and downstream dimensions and will provide adequate drainage through this small area. Since this process only impacts approximately 20 feet of drainage, it will be considered negligible and field fit during reclamation. Refer to Map RM-110-4A for detail.

The second drainage is located above the mine workings. Overland flow concentrates in a small ephemeral channel and is currently diverted around the mine workings to the east and west. At reclamation, flow from this area will be diverted over the constructed fill slope as shown on Map RM-110-4A. The upland drainage area is approximately 4.0 acres. Appendix G illustrates the hydrograph utilizing OSM's STORM runoff modeling program for a 100yr/24hr event of 2.48 inches of precipitation. This software predicted a flow from the upland area of 1.83 cfs. Although a very small amount of flow, the reconstructed fill slope will need protection to reduce or limit the probability of slope failure uncovering potentially toxic fill material.

The channel design feature with the STORM program was utilized to design a triangular channel. As shown in Appendix H, the channel will have side slopes of 3:1 and a depth of approximately 1.0 feet. Actual flow depth from the 100 year storm is approximately 0.27 feet giving a freeboard of nearly 9 inches. Figure 110.2-E illustrates the typical design of the triangular channel which will protect the fill slope from the erosive forces of storm water runoff.

Two other very small ephermal drainages exist above the mine site. These channels can be simply diverted to the east and west of the mine workings into existing natural channels. These diversion ditches are shown as UD-3 and UD-4 on Map RM-110.4A.

As part of the fill design on the south end of the mine workings, a concentrated flow pattern will be developed. Because of the very limited area that intercepts precipitation, there is no need to develop a designed channel for the potential flow. The slope will be protected using riprap in the bottom of the concentration flow area. Riprap (sized to approximately 4-8 inches) will be placed approximately 1 foot deep by approximately 2 feet wide. This will be sufficient to protect the slope from the erosive forces of storm water runoff. The reclaimed slopes will also be pocked to limit overland flow.

~~The other drainage, as mentioned above, will be constructed on the south end of the pad. The length of the channel is approximately 200 feet and the rise is approximately 50 feet equating in a slope of 4H:1V. With a slope this minor, it would not be advantageous for creating a design for this channel; however, the channel will be armored with rock riprap for extra protecting against erosion. Refer to any of the 110 series maps in the Maps Section for review.~~

Portal Backfilling

There are portals that provide access to underground workings of the Rockland Mine. They exist on the north side of the facility near the top of the access road. Refer to Map R106-1A for their locations. Figure 110.2-D illustrates how portals will be sealed and backfilled. Essentially, portals will be backfilled at least 10 feet inby the opening with overburden material. Backfilling will require approximately 63 cubic yard of material to complete. Highwall reclamation, as described above, will cover the backfilled openings completely and eliminate all access to underground workings.

R647-4-110.3 Post Mining Facilities

At the completion of mining and reclamation operations, all facilities, structures, piles, ponds, etc. will be reclaimed as outlined in the reclamation plan. No post mining structures or facilities will be left as part of the post mining land use for the Rockland Mine site.

R647-4-110.4 Acid Forming Material Disposition (Refer to table in Appendix C for segregated soil volume calculations)

The existing subsoil pile is located on the south side of the mine site. This stockpile contains approximately 4,269 cubic yards of material stored for use in reclamation. However, soil samples taken in 2005 and 2007(see analysis in Appendix D) indicate that there are acid forming materials (below pH of 6) in the top 1.0 feet of material on the south end of the pile. The extent of the acid forming materials is undetermined. However, for reclamation planning purposes, 20 feet on the south end of the pile will not be used as subsoil. This material, approximately 890 cubic yards, will be buried at the bottom of the highwall and covered with at least 2 feet of non-acid-forming material.

With the elimination of this acid-forming material from the subsoil balance the final total for usable subsoil equals 3,378 cubic yards. Paste pH tests will be conducted in the field during reclamation to ensure that no acid-forming materials will be used as a top cover. This field examination will also ensure that all suitable materials will be utilized to their fullest extent.

R647-4-110.5 Soil Redistribution and Revegetation

Soil redistribution depths have been calculated utilizing the known soil volumes in Appendix C and dividing by the areas needing covered. The depth of cover for subsoil material will be approximately six inches over all fill slopes as shown in Figure 110.2-C in the Figures Section. Depth of cover for topsoil resources amounts to only 1 inch over fill slopes. Topsoils stored and segregated on-site contain ditritus materials mixed within. This vegetative debris should enhance the quality and structure of this material making it a suitable growth medium.

Soil Redistribution

~~As mentioned in above,~~ Native overburdedn removed to mine the humic shale will be used as initial fill to backfill and eliminate, to the extent possible, all highwall areas. During reclamation, this material will be field analyzed to insure material quality. Material that tests with a pH below 6 or above 9 will be buried with at least 2.0 feet of non-toxic material.

As mentioned in the Operation Plan, "A portion of the subsoils are used to create a safety berm around the perimeter of the mine pad." Prior to redistributing the materials in the subsoil pile, the safety berm will be segregated by storing in a location so as not to interfere with backfilling activities. Over the life of the mining operations, these soils established a vegetative cover. Using these soils as a fill closer to the final surface could help in the establishment of final vegetation.

Dozers will be used to push soil materials in place. Initially, all deleterious material will be used as backfill at the bottom of the highwall areas. Fill material will be excavated from the outslope using a track-hoe and placed on the pad area. A dozer will push this material in place over the deleterious material backfilling the highwall and creating the initial contour. Subsoil segregated and stored on-site as well as the safety berm material will be placed at a depth of 6 inches on top of the fill material.

Boulders that have been stored on-site and used during mining operations will be collected and placed randomly on the reclaimed slope. The boulders will be placed in such a way as to mimic the surrounding undisturbed area and create habitat and shelter for small mammals.

After boulder placement, topsoil will be spread adequately to provide a depth of approximately 1 inch of cover. This will be the final contour. Analysis of subsoil and topsoil can be reviewed in Appendix D.

Utilizing a track-hoe, deep gouges will be randomly placed throughout the grade of the final contour. Deep gouges are constructed to retain moisture, minimize erosion and create and enhance wildlife habitat. Seeding will immediately follow the deep gouging process.

Revegetation

Seeding will take place as contemporaneously as is practical following contouring and deep gouging of the area being reclaimed. The seed mixture will be applied by hand broadcasting or by mechanical means. Because of the roughened nature of the seed bed, it is impossible to hand rake the seed to cover the soil. However, by seeding immediately after roughening, the seeds will settle into the voids of the soil. As the soil settles, seeds will be buried.

The Division of Oil, Gas, and Mining suggested the seed mix outlined in Table 2. This seed mix will be applied to all reclaimed surfaces at a rate of approximately 15 lbs/ac.

Table 2: Seed Mix For Rockland Mine Reclamation

Common Name	*Scientific Name*	*Lbs PLS/Acre*
Gardner Saltbrush	*Atriplex gardneri*	*3*
Shadscale	*Atriplex confertifolia*	*2*
Fourwing Saltbrush	*Atriplex canescens*	*2*
Russian Wild Rye	*Elymus juncea*	*4*
Indian Ricegrass	*Oryzopsis hymenoides*	*3*
Kochia	*Kochia prostrata*	*0.5*
	Total	***14.5***

After the seed is applied, the entire area will be hydromulched with a wood fiber or other acceptable mulch. The mulch will be applied at a rate of 2000 lbs./ac. for cover and protection.

Performance Standards for Vegetative Growth

Revegetation will be considered successful when growth has achieved 70 percent of the pre-mining vegetative ground cover. In the case of the Rockland Mine, success standards will be compared to the adjacent undisturbed areas as detailed by the vegetation survey in Appendix E. Vegetation must establish over a period of three years following the last seeding to be considered successful.

When the above standards have been met, the Division will determine that the revegetation work has been satisfactorily completed within practicable limits and approve release of the applied surety or incremental amount thereof.

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Rockland Mine

R647-4-113: Surety

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R647-4-113 SURETY

~~After receiving notification that the notice of intention has been approved, the Rockland Mine commits to providing to the Division a detailed bond estimate. The bond estimate will be based upon (a) the technical details of the approved mining and reclamation plan, (b) the proposed post mining land use, and (c) projected third party engineering and administrative costs to cover Division expenses incurred under a bond forfeiture circumstance.~~

Bond estimates were calculated utilizing the 2008 RSMeans Heavy Construction Cost Data, 22nd Annual Edition. Unit cost indices are calculated on earthwork and hydromulching operations. The line number references are given for each activity for easy review in RSMeasns data book. Total bond estimates for 2008 are $108,240.00. With an escalation factor of 3.8% for 5 years, the bond estimate in 2013 is $130,430.00. A surety bond for this amount is provided and payable to the Utah Division of Oil, Gas, and Mining. A copy of the surety is provided in Appendix I.

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Rockland Mine

R647-4-113: Surety

Add Bond Estimate (3 pages)

Bond Calculations Rockland Mine			
Direct Costs			
Subtotal Demolition		0	
Subtotal Earthwork	$	70,693.41	
Subtotal Revegetation	$	13,703.92	
Direct Costs Total	**$**	**84,397.33**	
Indirect Costs			
General Site Clean-Up	$	843.97	1.00%
Contractor Overhead and Profit	$	8,439.73	10.00%
Reclamation Management	$	6,118.81	7.25%
Contingency	$	8,439.73	10.00%
Indirect Costs Total	**$**	**23,842.25**	
2008 Total Costs	**$**	**108,239.58**	
Escalation Factor			3.80%
Number of Years			5
Escalation	$	22,189.03	
2013 Reclamation Costs for Rockland Mine	**$**	**130,428.61**	

Means Unit Cost

Line Number	Equipment	Crew	Daily Output	Labor Hours	Unit	Material	Labor	Equip	Total	Total Incl O&P
01 54 36.50.0100	Mob/Demob Dozer (for 50 mi RT)	B-34K	3	2.667	EA		$ 61.00	$110.00	$171.00	$ 217.00
01 54 36.50.0020	Mob/Demob Excavator (for 50 mi RT)	B34N	4	2	EA		$ 81.50	$207.00	$288.50	$ 355.00
01 54 36.50.2500	For each additional 5 miles distance (70 mi RT)						10%	10%		
31 2316.46.5020	300 hp Dozer, Common Earth, 100' Haul	B-10M	1650	0.007	BCY		$ 0.27	$ 0.84	$ 1.11	$ 1.34
31 2316.42.0300	Excavating, Common Earth, 3 yd Bucket	B-12D	2080	0.008	BCY		$ 0.27	$ 1.12	$ 1.39	$ 1.66
31 3713.10.0200	Riprap, machine placed for slope protectino	B-12G	62	0.258	LCY	26.5	$ 9.20	$ 10.35	$ 46.05	$ 55.00

Estimated Costs

Item	Quantity	Unit	Costs
Mob/Demob	4	EA	$ 3,308.40
Dozer	32,705.60	BCY	$ 36,303.22
Excavator @ 25% of Total Quantity	8,176.40	BCY	$ 11,365.20
Riprap	500	LCY	$ 23,025.00
Total			$ 70,693.41

Seeded Area 6.84 acres

Pocking

This cost is added to the excavating cost in the earthwork. No additional cost here.

Seed Mix for Rockland Mine

Common Name	Scientific Name	lbs PLS/ac	$/LB	$/AC	Total
Gardner Saltbrush	*Atriplex gardneri*	3	$ 13.00	$ 39.00	$ 266.76
Shadscale	*A. confertifolia*	2	$ 10.50	$ 21.00	$ 143.64
Fourwing Saltbrush	*A. canescens*	2	$ 5.00	$ 10.00	$ 68.40
Russian Wildrye	*Elymus juncea*	4	$ 2.75	$ 11.00	$ 75.24
Indian Ricegrass	*Oryzopsis hymenoides*	3	$ 9.00	$ 27.00	$ 184.68
Kochia	*Kochia prostrata*	0.5	$ 5.00	$ 2.50	$ 17.10
	TOTALS	14.5	$ 45.25	$ 110.50	**$ 755.82**

Hydromulch

						2008 Bare Costs				
Line Number	Equipment	Crew	Daily Output	Labor	Unit	Material	Labor	Equipment	Total	Total incl O&P
32 92.19.0200	Synthetic Erosion Control, Soil Sealent, Sprayed from Truck	B-81	80	0.3	MSF	$ 26.50	$ 10.05	$ 6.90	$ 43.45	$ 52.00

Estimated Costs

Item	Quantity	Unit	Total
Pocking	6.84 (added with earthwork)	AC	$ -
Seed	6.84	AC	$ 755.82
Hydromulch	298	MSF	$ 12,948.10
	TOTAL		**$ 13,703.92**

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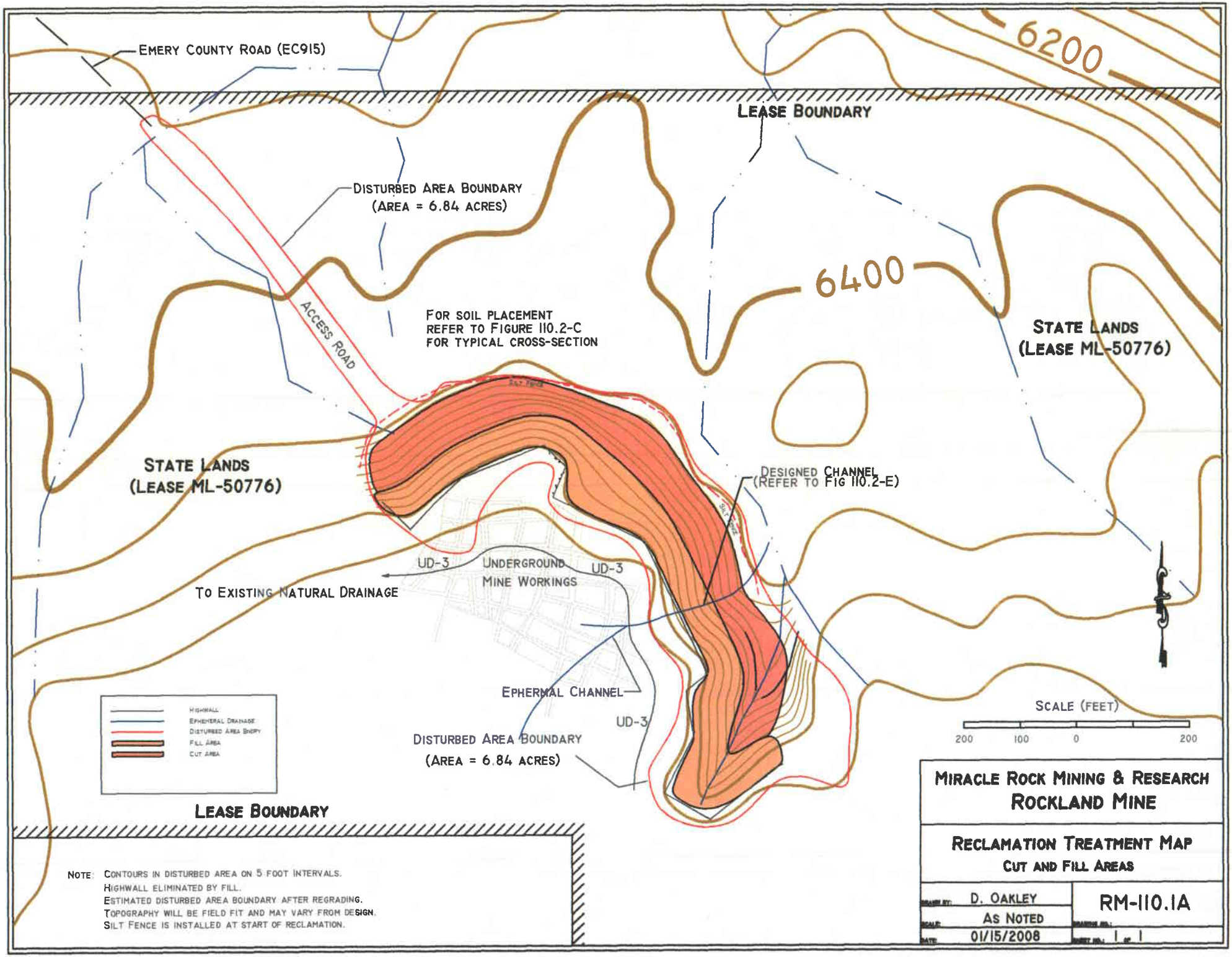
Rockland Mine

Maps Section

Replace Maps RM-110.1A, RM-110.2A, RM-110.3A, and RM-110.4A



NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
HIGHWALL ELIMINATED BY FILL.
ESTIMATED DISTURBED AREA BOUNDARY AFTER REGRADING.
TOPOGRAPHY WILL BE FIELD FIT AND MAY VARY FROM DESIGN.
SILT FENCE IS INSTALLED AT START OF RECLAMATION.

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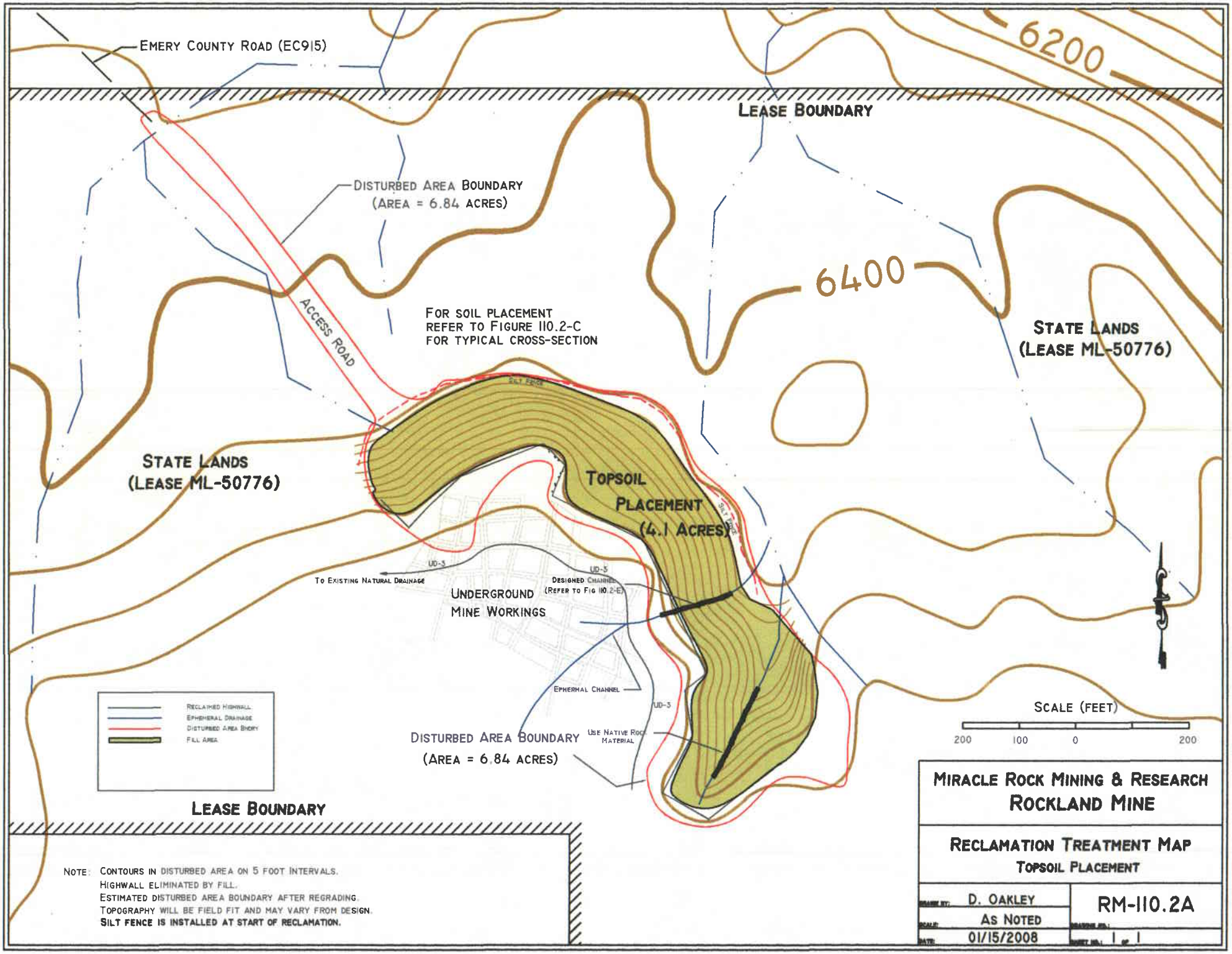
ROCKLAND MINE

RECLAMATION TREATMENT MAP
CUT AND FILL AREAS

DRAWN BY:	D. OAKLEY	RM-110.1A
SCALE:	AS NOTED	
DATE:	01/15/2008	SHEET NO.: 1 OF 1



NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
HIGHWALL ELIMINATED BY FILL.
ESTIMATED DISTURBED AREA BOUNDARY AFTER REGRADING.
TOPOGRAPHY WILL BE FIELD FIT AND MAY VARY FROM DESIGN.
SILT FENCE IS INSTALLED AT START OF RECLAMATION.

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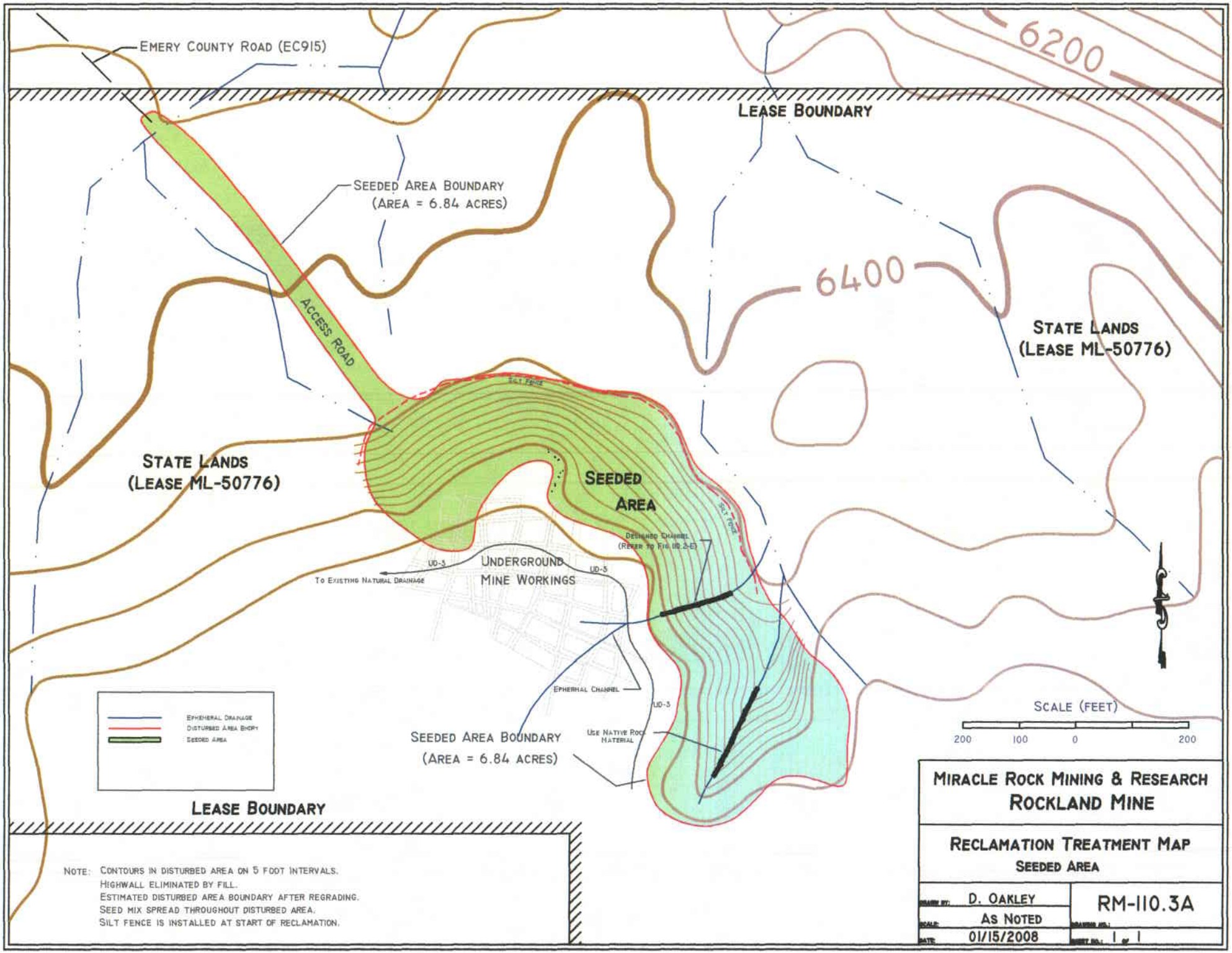
RECLAMATION TREATMENT MAP
TOPSOIL PLACEMENT

DRAWN BY:	D. OAKLEY	RM-110.2A
SCALE:	AS NOTED	
DATE:	01/15/2008	SHEET NO.: 1 OF 1



NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
HIGHWALL ELIMINATED BY FILL.
ESTIMATED DISTURBED AREA BOUNDARY AFTER REGRADING.
SEED MIX SPREAD THROUGHOUT DISTURBED AREA.
SILT FENCE IS INSTALLED AT START OF RECLAMATION.

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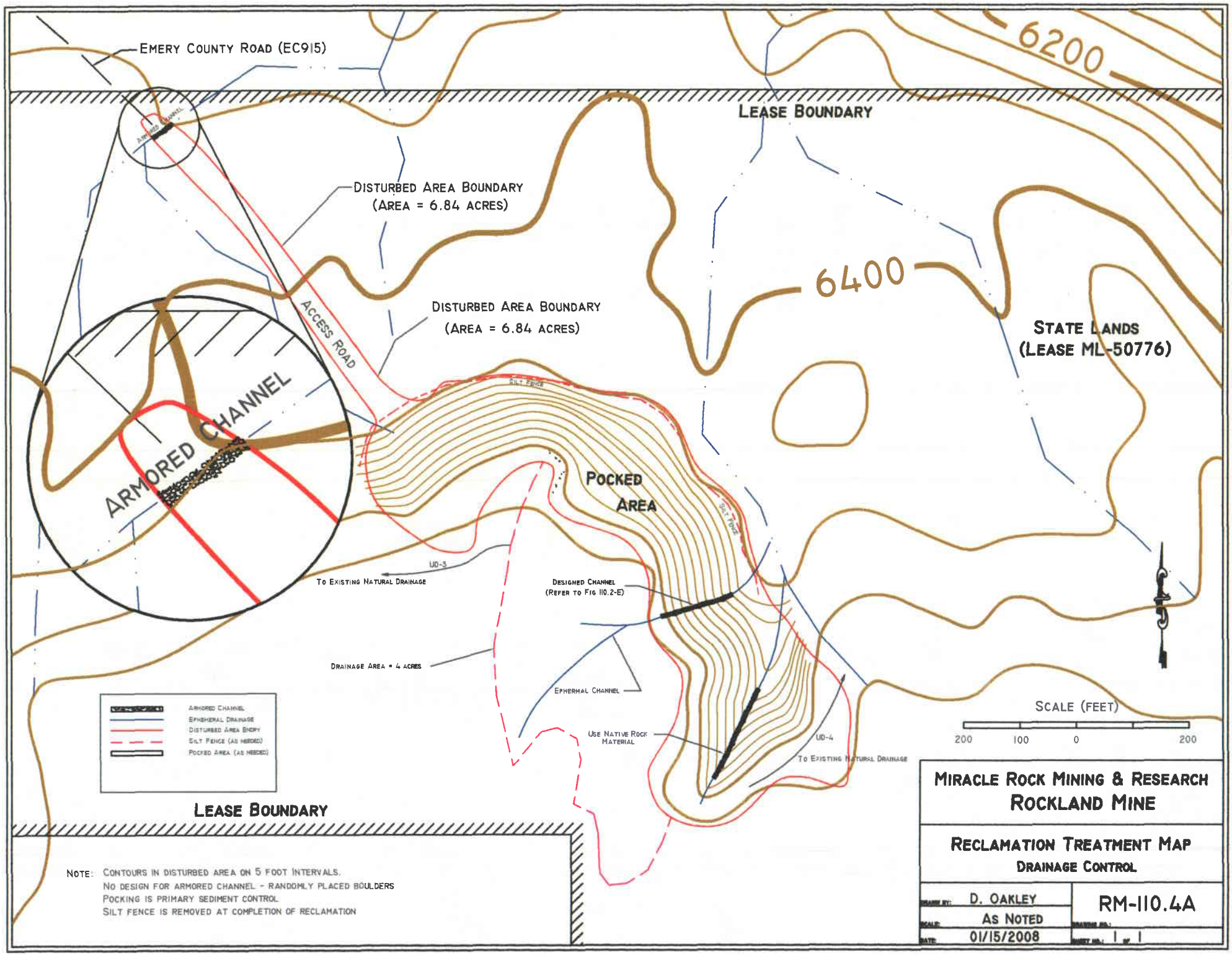
RECLAMATION TREATMENT MAP
SEEDED AREA

DRAWN BY:	D. OAKLEY	RM-110.3A
SCALE:	AS NOTED	DRAWING NO.:
DATE:	01/15/2008	SHEET NO.: 1 OF 1



NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
NO DESIGN FOR ARMORED CHANNEL - RANDOMLY PLACED BOULDERS
POCKING IS PRIMARY SEDIMENT CONTROL
SILT FENCE IS REMOVED AT COMPLETION OF RECLAMATION

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ROCKLAND MINE

RECLAMATION TREATMENT MAP
DRAINAGE CONTROL

DRAWN BY:	D. OAKLEY	RM-110.4A
SCALE:	AS NOTED	
DATE:	01/15/2008	SHEET NO.: 1 OF 1

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Rockland Mine

Appendix Section

Replace Appendix E

(Vegetation Cover Estimates)

Ocular Vegetation Estimate

Transect #	Cover Type	%	Transect #	Cover Type	%
#1	Vegetation	0	#11	Vegetation (Grass)	15
	Litter (Dead Mohogany Brush)	20		Litter	0
	Bare Ground	80		Bare Ground	85
	Canopy	0		0% Canopy	0
	1/4" Topsoil			3" Topsoil	
#2	Vegetation	0	#12	Vegetation (Grass)	4
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	96
	Canopy	0		Canopy	0
	1/4" Topsoil			1" Topsoil	
#3	Vegetation	0	#13	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	100
	Canopy	0		Canopy (Juniper)	50
	1" Topsoil			6" Topsoil	
#4	Vegetation	0	#14	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	100
	Canopy	0		Canopy (Juniper)	100
	1 1/2" Topsoil			3" Topsoil	
#5	Vegetation	0	#15	Vegetation (Rabbit Brush)	10
	Litter	0		Litter	0
	Bare Ground	20		Bare Ground	80
	Canopy (Pinion)	80		Canopy	10
	3" Topsoil			6 1/2" Topsoil	
#6	Vegetation (Rabbit Brush)	4	#16	Vegetation (Grass)	2
	Litter	0		Litter	0
	Bare Ground	31		Bare Ground	98
	Canopy (Juniper)	65		Canopy	0
	3" Topsoil			3" Topsoil	
#7	Vegetation (Sage Bush)	2	#17	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	18		Bare Ground	40
	Canopy (Juniper)	20		Canopy (Juniper)	60
	3 1/2" Topsoil			1" Topsoil	
#8	Vegetation (Fourwing)	1	#18	Vegetation (Grass)	0.5
	Litter	0		Litter	0
	Bare Ground	99		Bare Ground	99.5
	Canopy	0		Canopy	0
	3" Topsoil			2" Topsoil	
#9	Vegetation (Rabbit Brush)	15	#19	Vegetation (Brigham Tea)	2
	Litter	0		Litter	0
	Bare Ground	85		Bare Ground	98
	Canopy	0		0% Canopy	0
	3" Topsoil			1 1/2" Topsoil	
#10	Vegetation	0	#20	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	100
	Canopy	100		Canopy	0
	0 " Topsoil			1/4" Topsoil	

Cover Estimates	%
Vegetation (perennial grass, forb and shrub cover)	2.78
Litter	1.00
Bare Ground	81.475
Rock/Rock Fragments	0.00
Canopy	24.25
Total Cover Estimates	19.62
Revegetation Requirements (70% of above vegetation figure)	18.92

Miracle Rock Mining & Research

Rockland Mine

Appendix Section

Add Appendix F (SWPPP)

Appendix G (Hydrograph)

Appendix H (Channel Design Dimensions)

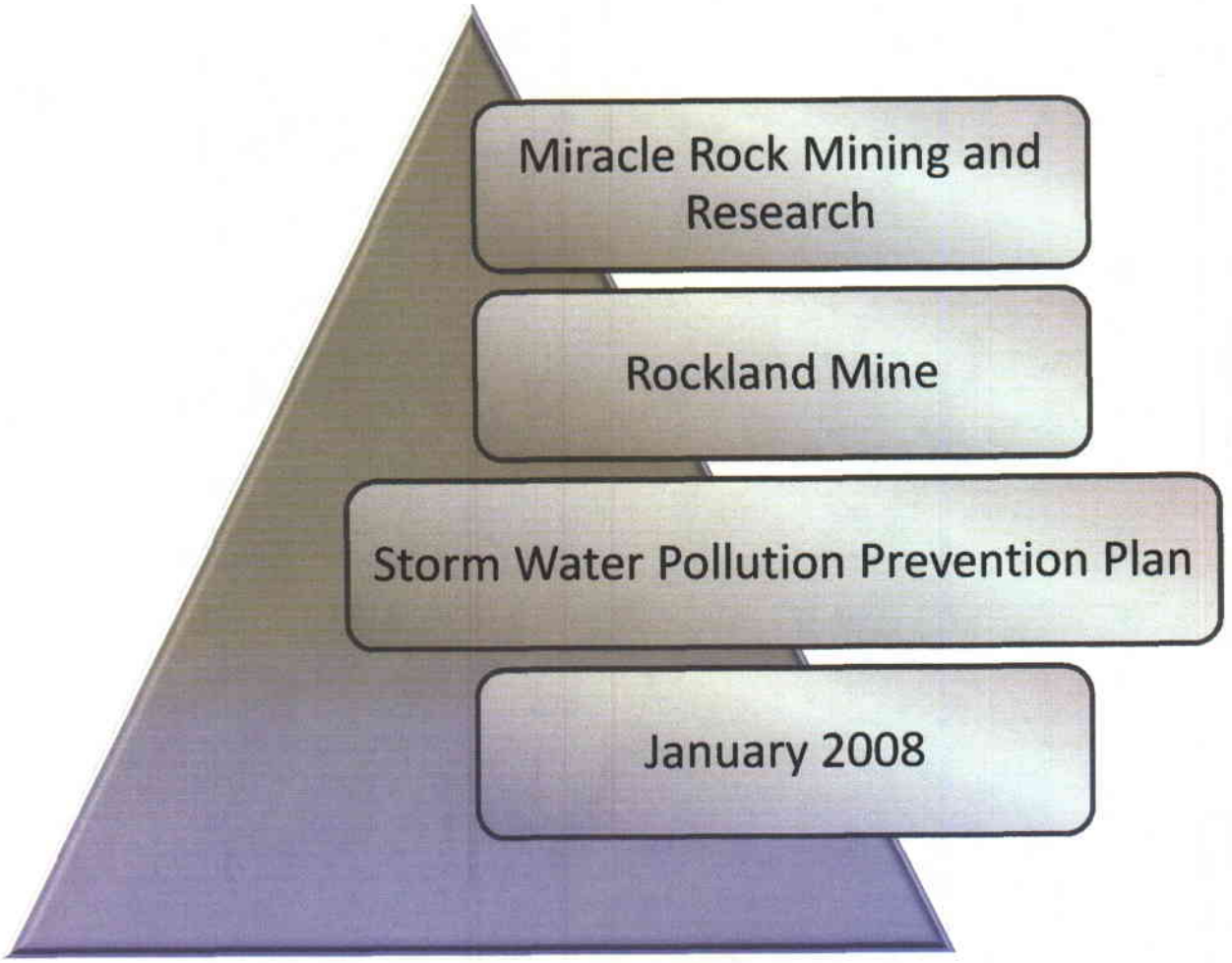
Appendix I (Surety Bond Documents)

Rockland Mine

Appendix F

Storm Water Pollution Prevention Plan

(SWPPP)



Prepared by Dennis Oakley, Consultant

January, 2008

Introduction

According to the storm water regulations in the State of Utah, the Rockland Mine facility falls under Group J (Storm water discharges associated with industrial activity from mineral mining and processing facilities). Requirements from Group J call for operators to develop a storm water pollution prevention plan. This document details the storm water management controls and implementation of such controls

1.0 Pollution Prevention Team

The plan shall identify a specific individual or individuals within the facility organization as members of a Storm Water Pollution Prevention Team that are responsible for developing the storm water pollution prevention plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

Team members include:

Name	Position

2.0 Description of Potential Pollutant Sources

This plan provides a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges of which may result in the discharge of pollutants during dry weather from storm water structures draining the facility. The potential sources of storm water pollution have been identified by in preparation of this plan, which could reasonably be expected to contribute to runoff from the facility. An on-site drainage map of all surface facilities and drainage routes is provided in Appendix A.

2.1 On-Site Drainage

The Drainage Control Map illustrates drainage direction of runoff, drainage control structures and discharge points from all applicable facility-related areas. Culverts, discharges from equipment and maintenance areas subject to storm runoff, locations of existing erosion and sedimentation control structures, receiving streams, locations of fuel

storage tanks, and locations of fueling station areas that are exposed to precipitation are also identified on this map.

2.2 Inventory of Exposed Materials

An inventory of the materials handled at the Rockland Mine that is potentially exposed to precipitation are listed in Table 1. The total inventory includes:

- Description of significant materials that have been handled, stored or disposed in a manner to allow exposure to storm water runoff.
- Method and location of on-site storage or disposal.
- Materials management practices employed to minimize contact of materials with storm water runoff
- The location and description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff
- Description of any treatment the storm water receives

Table 1: Material inventory of potential pollutants at the Rockland Mine Facility.

Material	Location	Quantity Used, Produced, or Stored	Potential Contact with Storm Water (Low, Med., High)	Materials Management Practice
Diesel Fuel	See Surface Facility Map in Appendix A	500 gallon maximum	med	Secondary Containment
Storage of Oils and Grease	See Surface Facility Map in Appendix A	Varies	low	Oil and grease containers are stored in the storage building
Trash	See Surface Facility Map in Appendix A	Varies	low	Trash removed from site after mining activities

Table 1 above will be updated from time to time to provide an accurate inventory of potential pollutants within the boundaries of the Rockland Mine facility.

2.3 Significant Spills and Leaks

Over the past three (3) years, there have been no significant spills or leaks reported at the Rockland Mine facility. In the event that a significant spill of leak occurs, this section will be updated.

2.4 Sampling Data

No historic sampling data for storm water discharges exist for the Rockland Mine. All future sampling data for the Rockland Mine site will be in accordance with Appendix II.J.5 of the Multi-Sector General Permit for Storm Water Discharges. This data will also be at the mine's main office in Emery, Utah.

2.5 Risk Identification and Summary of Potential Pollutant Sources

This section describes potential pollutant sources which currently exist on the Rockland Mine site. The location of these areas can be found by referencing the Surface Yard Map in Appendix A. These areas have a low risk of adding significant amounts of pollution to storm water discharges since all drainage from these areas are directed into an impoundment structure.

Fueling Facilities – Fueling facilities are located at the portal and ramp platform area. These facilities have a relatively high potential of exposure to storm water runoff even though the diesel fuel tank is fully contained. Spills may occur during refilling of the diesel fuel tank as well as equipment filling procedures unless strict care is taken. Spills of fuel that have contact with the ground will mix with storm water unless cleanup is conducted immediately.

The risk of fuel spills coming into contact with waters of the state is minimal because of the BMP's utilized on-site. BMP's are discussed later in this plan.

Oils and Grease – Oils and grease for equipment maintenance are stored on-site within an enclosed storage building (refer to Surface Facilities Map in Appendix A). As storage of oil has minimal risk of mixing with storm water, maintenance activities on the facilities pad increase the risk. Spilling of oils during these maintenance activities may occur unless strict care is taken. Spills of oil on the ground will mix with storm water unless cleanup is conducted immediately.

Trash – On-site storage of trash occurs only during mining activities. Since mining activities are not continuous at the Rockland Mine, potential for pollutants to come into contact with storm water are limited.

Trash (i.e. empty oil cans and grease tubes, boxes and other miscellaneous garbage) accumulates on the pad area in specified locations. These areas are

exposed to open elements and may mix with storm water during a precipitation event. All trash is removed from the facility and properly disposed of at the completion of all mining activities.

3.0 Measures and Controls

This plan develops a description of storm water management controls appropriate for the Rockland Mine to implement such controls. The appropriateness and priorities of controls in this plan reflect already identified potential sources of pollutants at the facility. A description of the storm water management controls address the following components:

- Good Housekeeping
- Preventive Maintenance
- Spill Prevention and Response Procedures
- Inspections
- Employee Training
- Record-keeping and Internal Reporting Procedures
- Non-storm Water Discharges
- Sediment and Erosion Control
- Management of Runoff

3.1 Good Housekeeping

Good housekeeping requires the maintenance of areas that may contribute pollutants to storm water discharges in a clean, orderly manner. As mentioned above, trash accumulates at specified locations on the mine pad. At the completion of mining activities all trash is disposed of at a certified landfill.

3.2 Preventative Maintenance

A preventive maintenance program involves timely inspection and maintenance of storm water management devices as well as inspecting and testing equipment and systems that may exist to uncover conditions that cause breakdowns or failures resulting in discharges of pollutants to surface waters.

Inspections of BMP's throughout the mine site, such as berms and impoundments, ensure proper diversion and treatment of runoff. If BMP's are found to be inefficient to control and treat runoff, they will be scheduled to be immediately repaired.

3.3 Spill Prevention and Response Procedures

In the case of spills of fuel or oil at the fueling or maintenance areas, the procedures outlined below will be followed.

Spill Prevention – Oil and fuel storage tanks will be inspected periodically for signs of leads, distortion, corrosion, etc. Any problem noted will be documented and scheduled for follow up action.

All tank filling operations will be supervised by qualified personnel to assure spill precaution practices are followed and that response is immediate in the event of a leak or discharge. Spill prevention equipment, such as covers, caps, gaskets, pumps, containment, valves and fittings will be maintained and operated in a manner that will prevent failures, leaks, spills or other incidents that could result in the release of oil.

Employees of Rockland Mine are trained in the spill prevention, maintenance, and response procedures to minimize or eliminate environmental damage as a result of a spill.

Response Procedures – In the case of a spill or release, immediate action should be taken to contain the spill. Containment measures include plugging the leak, diking, putting down absorbent material, digging a trench, closing stop valve, etc. **IT IS OF PRIMARY IMPORTANCE THAT OIL IS NOT ALLOWED TO LEAVE THE SITE AND/OR ENTER ANY WATERWAY.** If the spilled material does leave the company property, immediate efforts must be made to place appropriate absorbent materials in watercourses or drains, to minimize damage.

Clean up of small spills and leaks – Small spills and leaks will be cleaned up with an absorbent material. Once the fuel or oil is confined and absorbed, it will be containerized and disposed of in an appropriate manner off-site.

Clean up of large spills and leaks – Large spills and leaks, such as the spilled contents of the fuel storage tank, will be handled first to contain the spill to the immediate area. On-site equipment may need to be used to construct berms, trenches, or impoundments. Berms or trenches will be constructed to prevent spreading of pollutants. Impoundments will be constructed to confine the liquid for clean up.

Once the liquid is confined and controlled, an absorbent material, such as dirt, will be used to soak up the liquid. Rags, pads, pillows, etc. will be used to clean up all residual traces of the spill. Once all the pollutant has been removed from the surface as best as possible, the ground will be inspected for penetration of pollutants. All materials used to clean up the spill, as well as, contaminated soil will be removed from the site and taken to an approved landfill

3.4 Inspections

Inspections of all storm water control facilities are conducted on a quarterly basis at the Rockland mine. These inspections are conducted to verify the integrity of each structure, ensure erosion is being controlled on all slopes, and to check fueling and oil storage areas and waste disposal areas for evidence of discharges of contaminated storm water.

3.5 Employee Training

Employees will be trained periodically of all components of the storm water pollution prevention plan. Discussions will focus on spill prevention measures, good housekeeping, and spill response procedures. Training of employees will be conducted at least annually. Records of such training are noted in Appendix B.

3.6 Recordkeeping and Internal Reporting Procedures

Records of all spills, discharges, quality and quantity of discharges, inspections and maintenance activities which is conducted on storm water control structures or fueling and oil storage facilities will be maintained in Appendix C These records will be updated annually to ensure a consistent and proactive approach to prevent contamination of storm water discharges.

3.7 Non-Storm Water Discharges

No water sources that could cause a non-storm water discharge exist at the Rockland Mine.

3.8 Sediment and Erosion Control

Sediment control measures have been implemented on the disturbed area to minimize additional contributions of sediment solids to the receiving drainage. Best management practices are used to control erosion and sedimentation from mining operations. BMP's include some of the following controls; berms, impoundments, straw bales, silt fences, etc. Surface water quality will be protected by handling earth materials and runoff in a manner that minimizes the potential for pollution. Specifications for BMP installation are detailed in Appendix D.

Analysis of the stored overburden samples tested has shown that toxic materials (low pH) are present on-site. Discharges if any, of water from areas disturbed by mining and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for mineral mining promulgated by the EPA set forth in 40CFR Part 434.

3.9 Management of Runoff

As shown on the Drainage Control Map (Appendix A), there are two undisturbed ephemeral drainages adjacent to the disturbed area that could potentially be impacted by runoff from the disturbed area. The drainages are noted as UD-1 and UD-2. Disturbed areas that flow into these drainages are noted on the Map as DA-1 and DA-2. A third ditch, UD-3, is located above the highwall and diverts undisturbed runoff away from the mine site. Each area is discussed below. Runoff volumes from these areas have been calculated and best management practices (BMP's) have been designed accordingly.

Disturbed Area 1 (DA-1)
The mine pad area consists of hydrologic area DA-1. Its size is approximately 3.4 acres. All flow is confined to the pad and impoundment area. Any precipitation that falls onto the mine pad either puddles or flows as indicated by the flow lines on Map R107-1A. Runoff volumes have been calculated for the pad area using a 10 year/24 hour precipitation event of 1.51 inches. Peak discharge from the pad is 0.15 ac/ft.

Disturbed Area 2 (DA-2)
The area below the mine pad where material has been cast off the side slope consists of the hydrologic area DA-2. The material consists mainly of pebble to boulder sized rock and is highly permeable. No erosional effects have been indicated on the surface of these slopes. BMP's will not be used at the toe of the slope until final reclamation.

Undisturbed Drainage (UD-1)
Flow from the mine pad flows into the impoundment located on the east side of the pad. Discharge from the impoundment is treated before flowing into UD-1. Drainage UD-1 drains into an un-named ephemeral drainage which eventually flows into the Muddy River.

Undisturbed Drainage (UD-2)
Overland flows (if any) from the mine pad slopes drain into UD-2. This undisturbed drainage flows directly into the Muddy River drainage system.

Undisturbed Diversion (UD-3)
Ditch UD-3 is a historic diversion ditch that was cut with a bulldozer along an existing road above the mine site. This ditch diverts undisturbed runoff away from the topsoil storage area and directs flow into a natural drainage system. The natural drainage, like others in the area, are ephemeral and flow as a result of precipitation events.

4.0 Comprehensive Site Compliance Evaluation

The site compliance evaluation will provide a basis for evaluating the overall effectiveness of the storm water pollution prevention plan. A comprehensive site compliance evaluation will be conducted at the Rockland Mine at least once annually. Qualified personnel will conduct the comprehensive site inspection to:

- Confirm the accuracy of the description of potential pollutant sources contained in the storm water pollution prevention plan
- Determine the effectiveness of the plan
- Assess compliance with the terms and conditions of the storm water permit

The evaluation will be performed by the Pollution Prevention Team. They may be accompanied by other employees who are familiar with the mining operations and the goals and requirements of the storm water pollution prevention plan.

The process for conducting the site evaluation will include reviewing the plan; developing a list of those items which are part of the material handling, storage, and transfer area covered by the plan; and reviewing the mine's past year operations to determine if any additional areas should be included in the plan. A site inspection will also be conducted to determine if all storm water pollution prevention measures are accurately identified in the plan and that they are in place and working properly. This site inspection should also be conducted during routine inspections to immediately alleviate any future problems caused by storm water runoff.

The results of the comprehensive site compliance evaluation will be documented in a report signed by an authorized company official and retained in Appendix C. The report will summarize the scope of the evaluation, personnel making the evaluation, date of evaluation, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance to Section 3.0 above. The report will be retained as part of the plan for at least three (3) years and will identify any incidents of non-compliance, or a certification that the facility is in compliance with the storm water pollution prevention plan and state permit.

The description of potential pollutant sources and storm water control measures may need to be revised based on the site inspection results of the areas contained in Section 3.0. If necessary, the plan will be revised within two weeks after the date of the inspection. These revisions will be noted in Appendix E. Changes in the control measures will be scheduled for implementation on site in a timely manner.

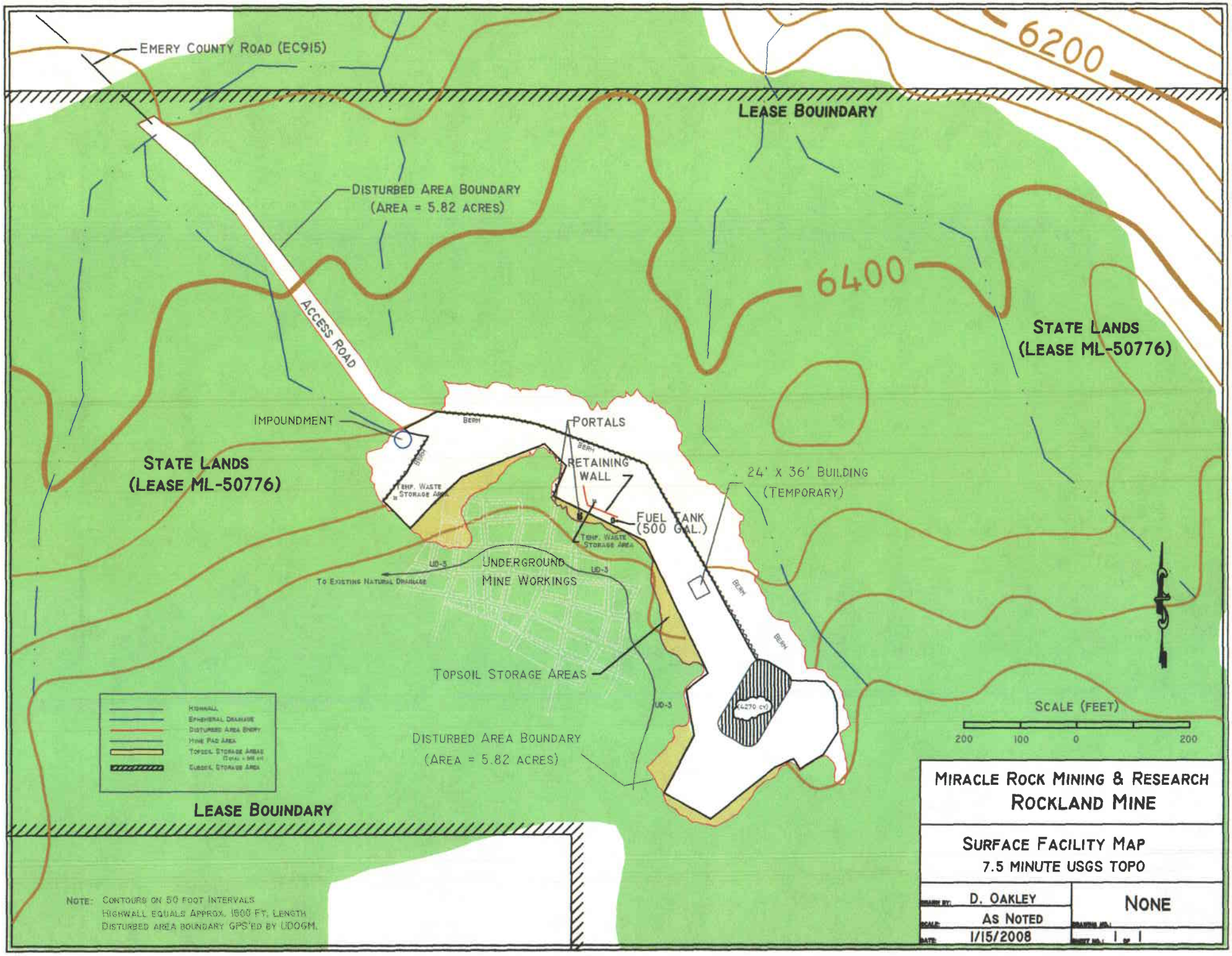
Rockland Mine

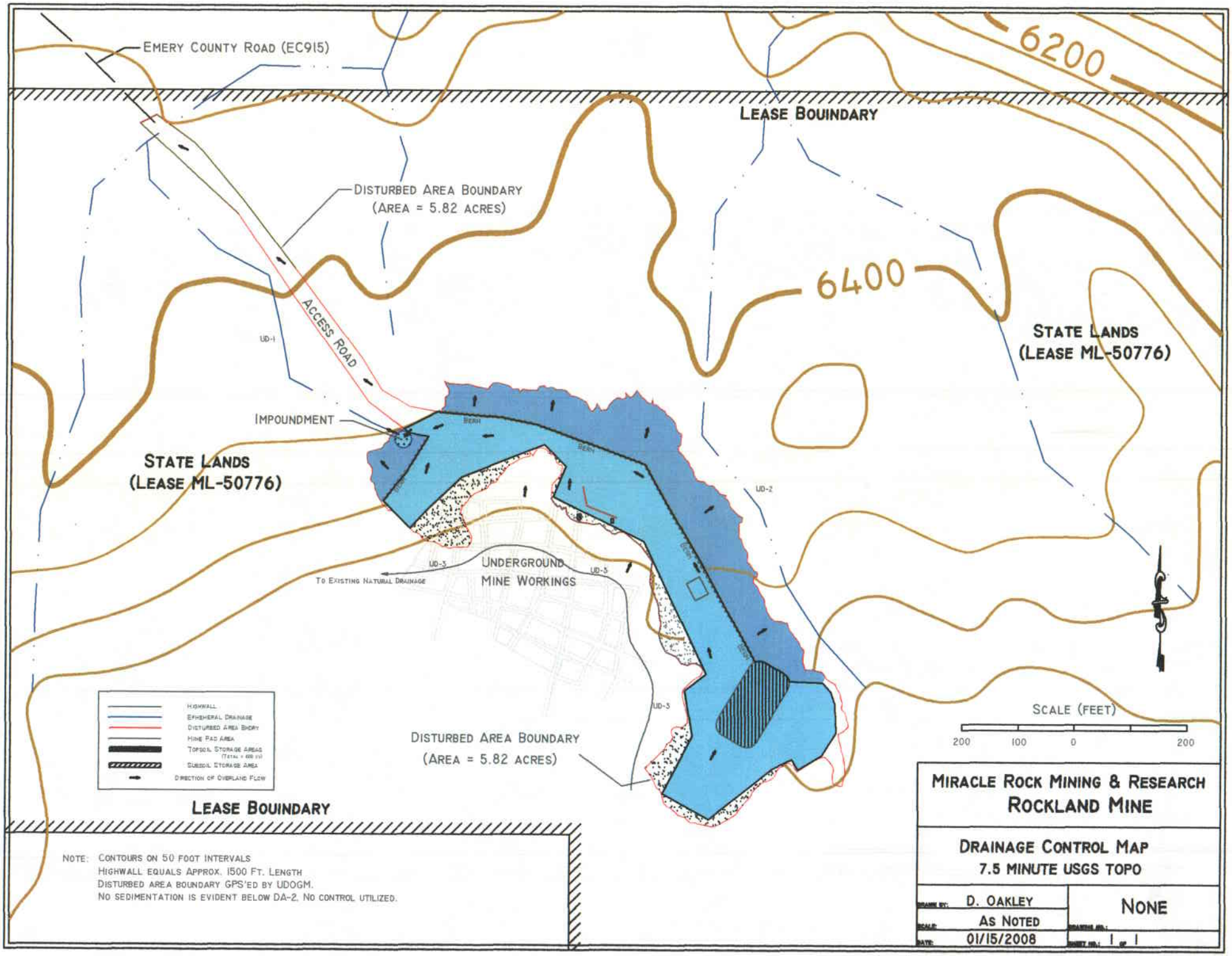
Storm Water Pollution Prevention Plan

Appendix A

Surface Facility Map

Drainage Control Map


EMERY COUNTY ROAD (EC915)
6200
LEASE BOUINDARY
DISTURBED AREA BOUNDARY
(AREA = 5.82 ACRES)
ACCESS ROAD
6400
STATE LANDS
(LEASE ML-50776)
IMPOUNDMENT
BERM
PORTALS
RETAINING WALL
24' X 36' BUILDING
(TEMPORARY)
FUEL TANK
(500 GAL.)
TEMP. WASTE STORAGE AREA
UD-3
UNDERGROUND
MINE WORKINGS
TO EXISTING NATURAL DRAINAGE
TOPSOIL STORAGE AREAS
(4270 CY)
HIGHWALL
EPHEMERAL DRAINAGE
DISTURBED AREA ENTRY
MINE PAD AREA
TOPSOIL STORAGE AREAS
SUBSOIL STORAGE AREA
SCALE (FEET)
200 100 0 200
LEASE BOUINDARY
NOTE: CONTOURS ON 50 FOOT INTERVALS
HIGHWALL EQUALS APPROX. 1500 FT. LENGTH
DISTURBED AREA BOUNDARY GPS'ED BY UDOGM.
MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE
SURFACE FACILITY MAP
7.5 MINUTE USGS TOPO
DRAWN BY: D. OAKLEY
SCALE: AS NOTED
DATE: 1/15/2008
NONE
DRAWING NO.:
SHEET NO.: 1 OF 1



NOTE: CONTOURS ON 50 FOOT INTERVALS
HIGHWALL EQUALS APPROX. 1500 FT. LENGTH
DISTURBED AREA BOUNDARY GPS'ED BY UDOGM.
NO SEDIMENTATION IS EVIDENT BELOW DA-2. NO CONTROL UTILIZED.

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

DRAINAGE CONTROL MAP
7.5 MINUTE USGS TOPO

DRAWN BY:	D. OAKLEY	NONE
SCALE:	AS NOTED	DRAWING NO.:
DATE:	01/15/2008	SHEET NO.: 1 OF 1

Rockland Mine

Storm Water Pollution Prevention Plan

Appendix B

Training Records

Storm Water Pollution Prevention Plan
Training Records

Rockland Mine Site

Date	Persons Trained	Training Components			
		Spill Prevention	Spill Response	House-keeping	Material Management Practices

Rockland Mine

Storm Water Pollution Prevention Plan

Appendix C

Comprehensive Site Evaluation

Comprehensive Site Evaluation

Rockland Mine Site

Date:

Time:

Inspector:

Weather Conditions:

Area Inspected	Problems Noted	Corrective Action Needed	Date Completed

Rockland Mine

Storm Water Pollution Prevention Plan

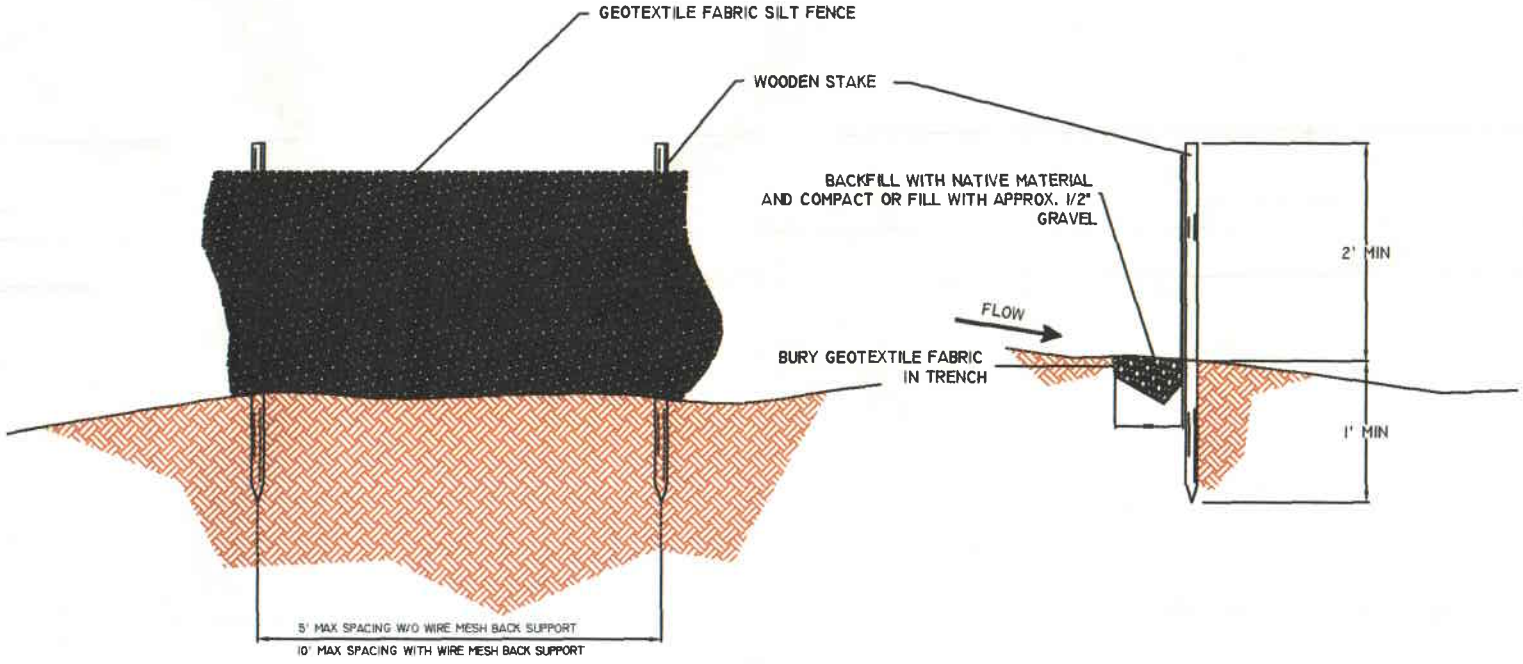
Appendix D

BMP Specifications

NOTES:
INSTALL SILT FENCE ALONG CONTOURS WHEN EVER POSSIBLE

WRAP ENDS SLIGHTLY UP-SLOPE TO PREVENT SEDIMENT FLOWING AROUND ENDS

PERFORM MAINTENANCE MONTHLY AND IMMEDIATELY AFTER STORMS

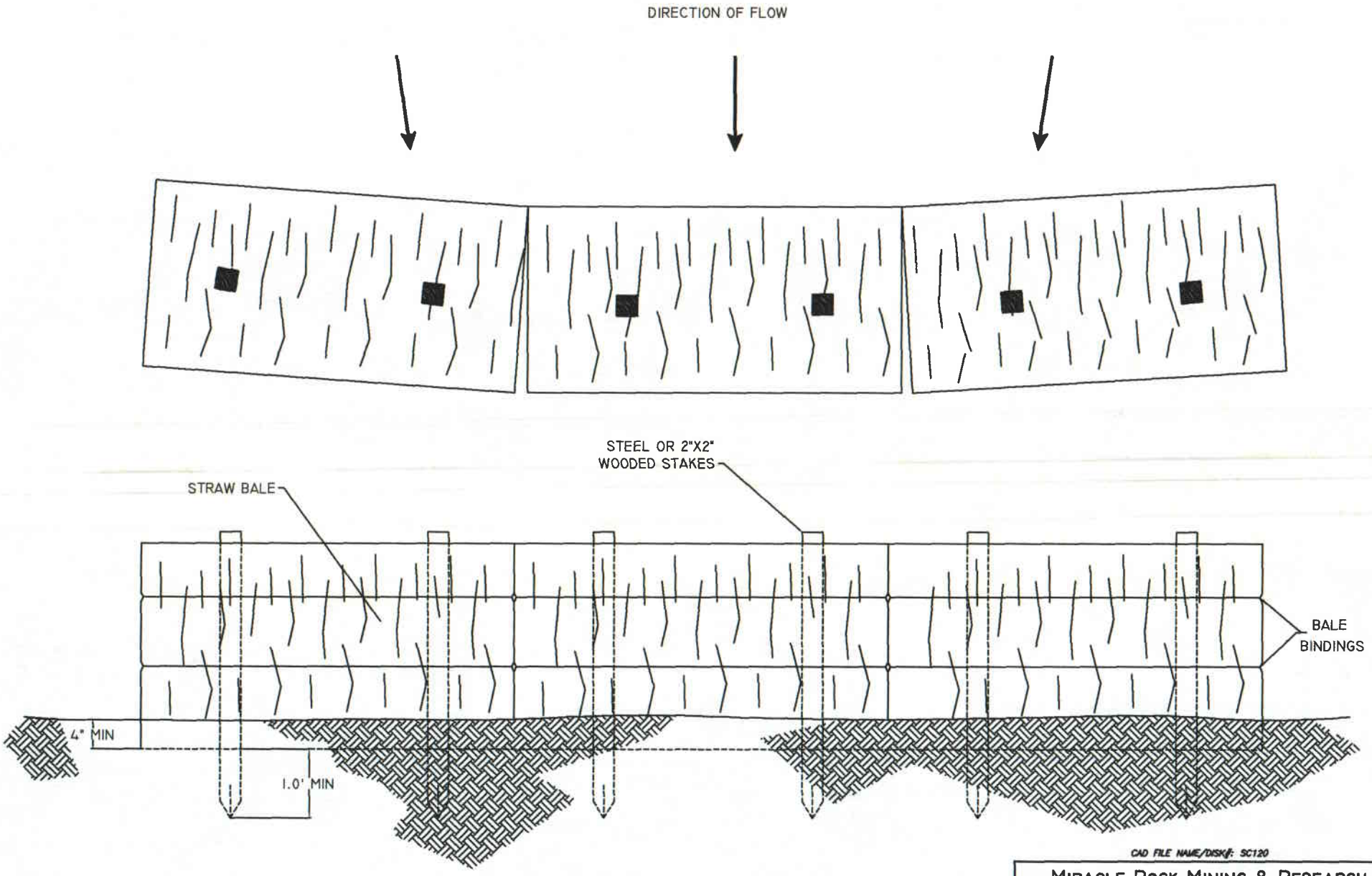


CAD FILE NAME/DISK#: SC110

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

SILT FENCE DETAIL
SWPPP BMP'S
TYPICAL DRAWING

DRAWN BY: DENNIS OAKLEY	SC110
SCALE: NONE	DRAWING #:
DATE: 3/7/2007	SHEET 1 OF 1 REV.



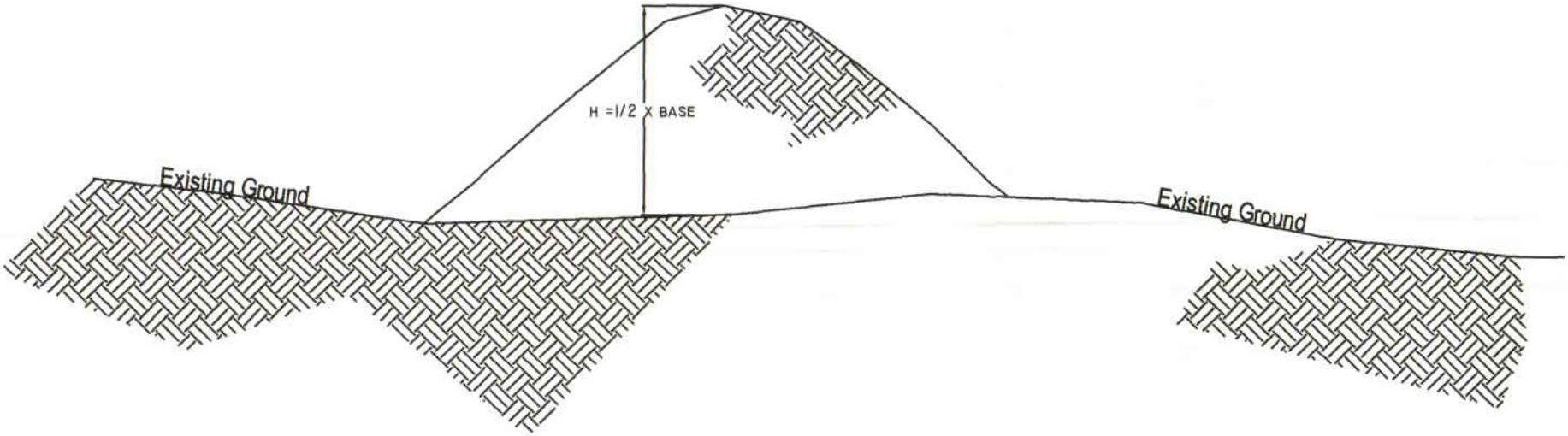
CAD FILE NAME/DISK#: SC120

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

STRAW BALES
SWPPP BMP'S
TYPICAL DRAWING

DRAWN BY: *DENNIS OAKLEY*	*SC120*
SCALE: *NOT TO SCALE*	DRAWING #:
DATE: *3/7/2007*	SHEET 1 OF 1 — REV. —

NOTES:
INSURE TIGHTLY ABUTED ENDS TO ELIMINATE LEAKAGE
KEY BALES INTO GROUND TO PREVENT FLOW UNDER BALES
COMPACT EARTH MATERIAL AROUND BASE OF BALES
USE TWO STAKES PER BALE TO SECURE IN PLACE



NOTES:
HEIGHT EQUALS 1/2 WIDTH OF BASE
BERM IS SLIGHTLY COMPACTED FOR STABILITY
USE FOR SEDIMENT CONTAINMENT

CAD FILE NAME/DISK#: D202

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

BERM
SWPPP BMP'S
TYPICAL CROSS-SECTION

DRAWN BY: DENNIS OAKLEY		D202
SCALE: NOT TO SCALE	DRAWING #:	
DATE: 3/7/2007	SHEET 1 OF 1	REV.

From: John Blake
To: Jan Morse
Date: 03/07/2008 8:18 AM
Subject: Re: Surety Concurrence for Red Leaf Resources

SITLA concurs with the reclamation bonds estimate recommended by DOGM. Thank you.

>>> Jan Morse 3/7/2008 6:41 AM >>>
Will,

I have reviewed the seven Notices of Intention for Small Mining Operations submitted by Red Leaf Resources for their oil shale operations in Uintah County. The surety amount for each of the seven sites is $20,700 escalated for three years, or $22,300.00 escalated for five years. This was determined based on:

3-year escalation (2010)

Item	Qty	Unit Cost	Total Cost
1st Acre Disturbance	1	$5,900.00	$5,900.00
Add'l Acres Disturbance	4	$3,700.00	$14,800.00
TOTAL		$20,700.00	

5-year escalation (2012)

Item	Qty	Unit Cost	Total Cost
1st Acre Disturbance	1	$6,300.00	$6,300.00
Add'l Acres Disturbance	4	$4,000.00	$16,000.00
TOTAL		$22,300.00	

These numbers apply to each of the seven Notices submitted on February 25, 2007. Our file numbers are:
S/047/0093 RLR Site #1
S/047/0094 RLR Site #2
S/047/0095 RLR Site #3
S/047/0096 RLR Site #4
S/047/0097 RLR Site #5
S/047/0098 RLR Site #6
S/047/0099 RLR Site #7

Please send your concurrence via email.

Thanks!

Internal
Incoming

From: Janice Reed-Campbell
To: Penny Berry
Date: 5/7/2008 10:10:24 AM
Subject: Re: Red Leaf Resources Inc.

Hi,

We got all of the listed mines on February 28. Matt had no comment on any of them. Hope this helps.

Janice

>>> Penny Berry 5/2/2008 2:11 PM >>>
You can just zip me an email with the info and I'll do the rest. Thanks so much and you have an awesome weekend!

>>> Janice Reed-Campbell 5/2/2008 10:44 AM >>>
I'm good, too. I'll check on those and let you know. I suspect, based on Matt's pattern, that he had No Comment on them. Do you need a letter or email or some such to go into your files?

>>> Penny Berry 5/2/2008 9:57 AM >>>
Hi There! How are you? It's warm'in up so I'm good. I was wondering sometime ago I sent you seven NOI-SMO's, could you please update me. Thanks so much for all your help. Have a great one!

OOps....I forgot the permit numbers...sorry.

S0470093
S0470094
S0470095
S0470096
S0470097
S0470098
S0470099

Rockland Mine

Appendix G

Hydrograph

Project Title = Rockland1

WATERSHED HYDROGRAPH

-- Watershed data for watershed # 1

Curve number = 80.0

Area = 4.0 acres

Hydraulic length = 400.00 feet

Elevation change = 5.0 feet

Concentration time = 0.06 hours

Unit hydrograph type = Forested

-- Total Area = 4.0 acres

-- Storm data

Total precipitation = 2.5 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 1.83 cfs

Discharge volume = 0.29 acre ft

time	rainfall	hydrograph	time	rainfall	hydrograph
(hr.)	(in.)	(cfs)	(hr.)	(in.)	(cfs)
0.00	0.000	0.000 *	0.20	0.005	0.000
0.40	0.005	0.000 *	0.60	0.005	0.000
0.80	0.005	0.000 *	1.00	0.005	0.000
1.20	0.006	0.000 *	1.40	0.006	0.000
1.60	0.006	0.000 *	1.80	0.006	0.000
2.00	0.006	0.000 *	2.20	0.006	0.000
2.40	0.006	0.000 *	2.60	0.006	0.000
2.80	0.006	0.000 *	3.00	0.006	0.000
3.20	0.007	0.000 *	3.40	0.007	0.000
3.60	0.007	0.000 *	3.80	0.007	0.000
4.00	0.007	0.000 *	4.20	0.008	0.000
4.40	0.008	0.000 *	4.60	0.008	0.000
4.80	0.008	0.000 *	5.00	0.008	0.000
5.20	0.008	0.000 *	5.40	0.008	0.000
5.60	0.008	0.000 *	5.80	0.008	0.000
6.00	0.008	0.000 *	6.20	0.010	0.000
6.40	0.010	0.000 *	6.60	0.010	0.000
6.80	0.010	0.000 *	7.00	0.010	0.000

time (hr.)	rainfall (in.)	hydrograph (cfs)	time (hr.)	rainfall (in.)	hydrograph (cfs)
7.20	0.010	0.000 *	7.40	0.010	0.000
7.60	0.010	0.000 *	7.80	0.010	0.000
8.00	0.010	0.000 *	8.20	0.013	0.000
8.40	0.013	0.000 *	8.60	0.013	0.000
8.80	0.014	0.000 *	9.00	0.014	0.000
9.20	0.016	0.000 *	9.40	0.016	0.000
9.60	0.017	0.000 *	9.80	0.018	0.000
10.00	0.018	0.000 *	10.20	0.023	0.000
10.40	0.023	0.000 *	10.60	0.027	0.001
10.80	0.031	0.007 *	11.00	0.031	0.015
11.20	0.048	0.034 *	11.40	0.048	0.056
11.60	0.212	0.316 *	11.80	0.377	1.067
12.00	0.377	1.827 *	12.20	0.071	1.236
12.40	0.071	0.943 *	12.60	0.054	0.885
12.80	0.037	0.777 *	13.00	0.037	0.715
13.20	0.027	0.630 *	13.40	0.027	0.560
13.60	0.024	0.487 *	13.80	0.021	0.406
14.00	0.021	0.337 *	14.20	0.015	0.265

time	rainfall	hydrograph	time	rainfall	hydrograph
(hr.)	(in.)	(cfs)	(hr.)	(in.)	(cfs)
14.40	0.015	0.232 *	14.60	0.015	0.214
14.80	0.015	0.202 *	15.00	0.015	0.193
15.20	0.015	0.187 *	15.40	0.015	0.183
15.60	0.015	0.180 *	15.80	0.015	0.179
16.00	0.015	0.178 *	16.20	0.009	0.152
16.40	0.009	0.137 *	16.60	0.009	0.132
16.80	0.009	0.127 *	17.00	0.009	0.122
17.20	0.009	0.119 *	17.40	0.009	0.116
17.60	0.009	0.113 *	17.80	0.009	0.111
18.00	0.009	0.110 *	18.20	0.009	0.110
18.40	0.009	0.110 *	18.60	0.009	0.110
18.80	0.009	0.110 *	19.00	0.009	0.111
19.20	0.009	0.111 *	19.40	0.009	0.111
19.60	0.009	0.111 *	19.80	0.009	0.112
20.00	0.009	0.112 *	20.20	0.006	0.098
20.40	0.006	0.091 *	20.60	0.006	0.088
20.80	0.006	0.085 *	21.00	0.006	0.083
21.20	0.006	0.081 *	21.40	0.006	0.079

time	rainfall	hydrograph	time	rainfall	hydrograph
(hr.)	(in.)	(cfs)	(hr.)	(in.)	(cfs)
21.60	0.006	0.078 *	21.80	0.006	0.077
22.00	0.006	0.076 *	22.20	0.006	0.076
22.40	0.006	0.076 *	22.60	0.006	0.076
22.80	0.006	0.076 *	23.00	0.006	0.076
23.20	0.006	0.076 *	23.40	0.006	0.076
23.60	0.006	0.076 *	23.80	0.006	0.077
24.00	0.006	0.077 *	24.20	0.000	0.048
24.40	0.000	0.032 *	24.60	0.000	0.026
24.80	0.000	0.020 *	25.00	0.000	0.015
25.20	0.000	0.011 *	25.40	0.000	0.007
25.60	0.000	0.005 *	25.80	0.000	0.002
26.00	0.000	0.001 *	26.20	0.000	0.000
26.40	0.000	0.000 *			

Rockland Mine

Appendix H

Computed Channel Design Dimensions

STORM -- Version 6.21

General Channel Design

| Title Ephermal Channal |

| Channel Type.....= Triangle |

| ┌──────────── Channel Report ────────────┐

| First Side Slope 3.000

| Second Side Slope 3.000

| Flow depth (ft).....= 0.27

| Bed Slope 0.500

| Manning"s n 0.032

| Discharge 1.83

| CFS.....= 1.83

| Cross section area (sqft)..= 0.22

| Hydrualic radius.....= 0.13

| fps.....= 8.36

| Froude number.....= 4.118

Rockland Mine

Appendix I

Surety Bond Documents

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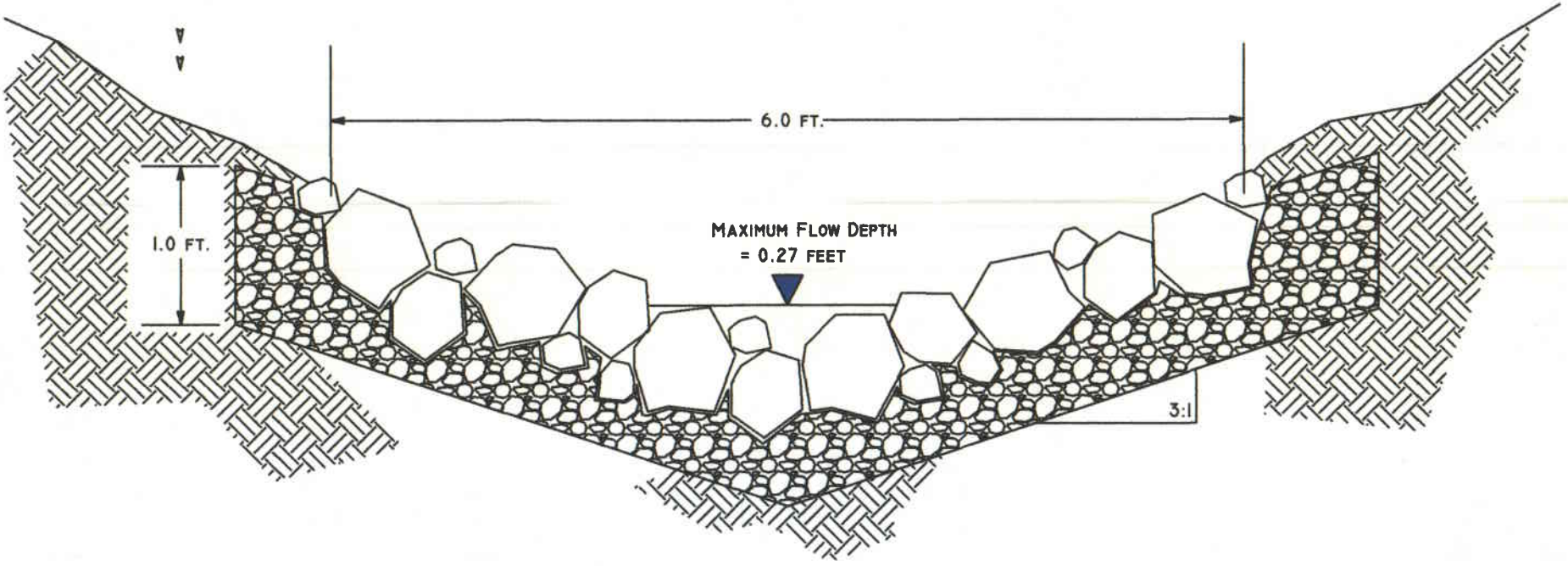
Rockland Mine

Figures Section

Add Figure 110.2E

CHANNEL DESIGN CROSS-SECTION



NOTE:

FILTER MATERIAL CONSISTS OF 1" MINUS WASHED GRAVEL

RIPRAP MATERIAL CONSISTS OF ANGULAR ROCK MATERIAL OF 4-8 INCH

FREE BOARD EQUALS 8.4 INCHES

TOP WIDTH CAN BE REDUCED TO 3.0 FEET AND RETAIN ADEQUATE FREE BOARD

MIRACLE ROCK MINING & RESEARCH ROCKLAND MINE	
TYPICAL CROSS-SECTION CHANNEL DESIGN 100YR/24HR EVENT	
D. OAKLEY	FIG. 110.2-E
NONE	
5/15/2008	SHEET NO. 1 OF 1

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Rockland Mine

R647-4-106: Operation Plan

Replace page 6

commences at the Rockland Mine, these materials (rock, subsoil, topsoil) will be utilized for backfilling the highwall. Special placement sequences of these materials are addressed in the Reclamation Plan. Refer to Section R647-4-110.5 Soil Redistribution and Revegetation prior to moving these materials.

R647-4-106.7 Vegetation

The Rockland Mine disturbed area covers approximately 5.82 acres. Prior to disturbance, the native vegetation of the mine and surrounding area consisted of trees, shrubs and grasses. Tree varieties consist of pinions (*Pinus edulis*) and Utah junipers (*Juniperus osteosperma*). A diverse shrub community exists in the area with the major types being black sagebrush (*Artemisia nova*), shadscale (*Atriplex confertifolia*), fourwing saltbrush (*A. canesens*), and galleta (*Hilaria jamesii*). Grasses typical of the area include salina wildrye (*Leymus salinus*), and Indian ricegrass (*Oryzopsis hymenoides*).

A vegetation survey was conducted on an undisturbed area adjacent to the mine site. Twenty transects were evaluated using an ocular method (line intercept method) for estimating percent cover by type. Types recorded are living cover, litter, rock cover, and bare ground. Living cover is broken into two components; understory and canopy cover.

Results of the survey found an understory cover of only 2.7% and canopy of 24.3%. Canopy consisted of pinyon pine and Utah juniper cover. Litter averaged only 1% of the total cover, while no rock or rock fragments were found in the study area. Bare ground averaged 63% of the total area. A spreadsheet of the vegetation survey is found in Appendix E. Based on the results of the vegetation survey, revegetation must achieve a success standard of 70% of the pre-mining vegetative ground cover or ~~19.6%~~ 18.9%.

R647-4-106.8 Geology

As mentioned above, the Rockland is located stratigraphically in the Upper Cretaceous Ferron Sandstone Member of the Mancos Shale. The topographic setting consists of massive beds of very fine- to fine-grained sandstone, carbonaceous shale, coal, mudstone, and siltstone. Outcrops of the Ferron Aquifer exist near the area of the Rockland Mine. The potentiometric surface of the aquifer, however, indicates that recharge comes from the Wasatch Plateau to the west (UGS Bulletin #132, 2003).

The mine site lies approximately 500 feet above the Quitchupah and Muddy Creek drainages. These deep drainage systems form the boundary of the outcropping aquifer. No ground water wells exist in the area. The surface drainage system of the Rockland Mine area is confined exclusively to the Muddy Creek drainage system. Any precipitation that falls on the mine site reports to ephemeral drainages and eventually to this system.

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Rockland Mine

R647-4-107: Operation Practices

Replace page 2-3

Disturbed Area 1 (DA-1)

The mine pad area consists of hydrologic area DA-1. Its size is approximately 3.4 acres. All flow is confined to the pad and impoundment area. Any precipitation that falls onto the mine pad either puddles or flows as indicated by the flow lines on Map R107-1A. Runoff volumes have been calculated for the pad area using a 10 year/24 hour precipitation event of 1.51 inches. Peak discharge from the pad is 0.15 ac/ft.

Disturbed Area 2 (DA-2)

The area below the mine pad where material has been cast off the side slope consists of the hydrologic area DA-2. The material consists mainly of pebble to boulder sized rock and is highly permeable. No erosional effects have been indicated on the surface of these slopes. BMP's will not be used at the toe of the slope until final reclamation.

Undisturbed Drainage (UD-1)

Flow from the mine pad flows into the impoundment located on the east side of the pad. Discharge from the impoundment is treated before flowing into UD-1. Drainage UD-1 drains into an un-named ephemeral drainage which eventually flows into the Muddy River.

Undisturbed Drainage (UD-2)

Overland flows (if any) from the mine pad slopes drain into UD-2. This undisturbed drainage flows directly into the Muddy River drainage system.

Undisturbed Diversion (UD-3)

Ditch UD-3 is a historic diversion ditch that was cut with a bulldozer along an existing road above the mine site. This ditch diverts undisturbed runoff away from the topsoil storage area and directs flow into a natural drainage system. The natural drainage, like others in the area, are ephemeral and flow as a result of precipitation events.

R547-4-107.3 Erosion Control

Sediment control measures have been implemented on the disturbed area to minimize additional contributions of sediment solids to the receiving drainage. Best management practices are used to control erosion and sedimentation from mining operations. BMP's include some of the following controls; berms, impoundments (refer to photos), straw bales, silt fences, etc. Surface water quality will be protected by handling earth materials and runoff in a manner that minimizes the potential for pollution. Locations of sediment control practices are shown on the Drainage Control Map (Map R107-1A) in the Maps Section. Specifications for BMP installation are detailed in the tabbed BMP Section.

The Rockland Mine has submitted a Notice of Intent (NOI) to the Division of Water Quality to comply with the requirements of the Clean Water Act. This NOI permits the site to discharge storm water associated with their industrial activity into the waters of the United States. As part of this permit, a Storm Water Pollution Prevention Plan (SWPPP) has been developed for the site. ~~Since the mine site is rarely occupied, the SWPPP is kept at the Miracle Rock Mining and~~

~~Research offices located at 400 South 200 East, Emery, Utah.~~ Refer to Appendix F for review of this plan.

Analysis of the stored overburden samples tested has shown that toxic materials are present on-site (refer to Appendix D for soil sample results). Discharges if any, of water from areas disturbed by mining and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for mineral mining promulgated by the EPA set forth in 40CFR Part 434.

R647-4-107.4 Deleterious Materials

All deleterious or potentially deleterious materials shall be safely removed from the site or kept in an isolated condition such that adverse environmental effects are eliminated or controlled. Best management practices (BMP's) will be used to minimize contact of materials with rainfall and runoff. BMP's may be structural or non-structural controls that reduce or eliminate pollutants in storm water runoff.

R647-4-107.5 Soils

As mentioned above, soils, including topsoil and subsoil, are removed, segregated, and stored in a stable condition so that they may be used for reclamation. Storage locations are identified on the Surface Facilities Map (Map R106-1A) in the Maps Section.

R647-4-107.6 Concurrent Reclamation

Occasionally, during operations, disturbed areas may be reclaimed when no longer needed. All areas which have been disturbed but are not routinely or currently utilized will be kept in a safe and environmentally stable condition. Contemporaneous reclamation will comply with the plans outlined in R647-4-110 and R647-4-111. As these areas are reclaimed, the area reclaimed will be outlined on a map and reported to the Division.

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Rockland Mine

R647-4-109: Impact Assessment

Replace page 2

overburden is eight to 12 feet of mineral product. Highwall failure has not been a problem in the past because no groundwater exists in the area of mining and the rock mass of the overburden is structurally sound.

Rockfall problems have been managed utilizing scaling method to remove potential fall areas. Scaling is conducted immediately after blasting activities and the removal of the overburden. Scaling is completed using track-hoe bucket removing all loose rock material. No undercutting of the mineral product will occur. In the occurrence highwall stability becomes a problem, slope geometry modification and/or benching methods may be necessary. Approval by the Division will be required prior utilizing methods other than scaling.

Erosion

Erosion and sediment control practices have been previously addressed in R647-4-107 Operation Practices. A Storm Water Pollution Prevention Plan (SWPPP) as required by the Division of Water Quality is maintained at the owner's main office in Emery, Utah. A copy of this document is also found in Appendix F.

Air Quality

Impacts to air quality resources due to mining and reclamation operations are considered temporary. Emissions realized on the mine site are from equipment, blasting, loading and hauling operations. There are no permitting requirements required by the Division of Air Quality for this mining operation.

Public Safety

Public safety issues have been addressed at the Rockland Mine. There is only one access road into the mine site from Emery County Road 915. The mine entrance has been gated and is locked when idled to prevent public access into the mine site. A sign identifying the phrase, "NO TRESSPASSING" is installed on the locked gate.

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Rockland Mine

R647-4-110: Reclamation Plan

Replace pages 4-7

Impoundment Removal

One impoundment exists within the disturbed area of the site. This impoundment is located mid-way and along the south side of the access road. The impoundment measures approximately 15 feet in diameter by 3 feet deep. This impoundment has been constructed to treat runoff from the mine pad area and a portion of the access road area. During road reclamation, the impoundment will be reclaimed to compliment the topography of the surrounding area. The contour of the regraded area will be identical to the adjacent undisturbed area.

Drainage from the impoundment was routed along the side of the road to a natural drainage approximately 700 feet away. This area will be reclaimed as part of the road reclamation and no other drainage will be constructed.

Erosion control will be provided using deep gouging techniques. Deep gouges are constructed to retain moisture, minimize erosion and create and enhance wildlife habitat.

The entire area will be reseeded with the approved seed mix in Table 2.

Drainage and Natural Drainage Development

There are two small natural ephermal drainages that will passes through the disturbed area. The first ~~One~~ drainage passes under the access road near the mine gate and is approximately 20 feet in length. This drainage will be reclaimed by first removing the culvert. The reestablishment of this small section will be constructed to match the upstream and downstream dimensions and will provide adequate drainage through this small area. Since this process only impacts approximately 20 feet of drainage, it will be considered negligible and field fit during reclamation. Refer to Map RM-110-4A for detail.

The second drainage is located above the mine workings. Overland flow concentrates in a small ephemeral channel and is currently diverted around the mine workings to the east and west. At reclamation, flow from this area will be diverted over the constructed fill slope as shown on Map RM-110-4A. The upland drainage area is approximately 4.0 acres. Appendix G illustrates the hydrograph utilizing OSM's STORM runoff modeling program for a 100yr/24hr event of 2.48 inches of precipitation. This software predicted a flow from the upland area of 1.83 cfs. Although a very small amount of flow, the reconstructed fill slope will need protection to reduce or limit the probability of slope failure uncovering potentially toxic fill material.

The channel design feature with the STORM program was utilized to design a triangular channel. As shown in Appendix H, the channel will have side slopes of 3:1 and a depth of approximately 1.0 feet. Actual flow depth from the 100 year storm is approximately 0.27 feet giving a freeboard of nearly 9 inches. Figure 110.2-E illustrates the typical design of the triangular channel which will protect the fill slope from the erosive forces of storm water runoff.

Two other very small ephermal drainages exist above the mine site. These channels can be simply diverted to the east and west of the mine workings into existing natural channels. These diversion ditches are shown as UD-3 and UD-4 on Map RM-110.4A.

As part of the fill design on the south end of the mine workings, a concentrated flow pattern will be developed. Because of the very limited area that intercepts precipitation, there is no need to develop a designed channel for the potential flow. The slope will be protected using riprap in the bottom of the concentration flow area. Riprap (sized to approximately 4-8 inches) will be placed approximately 1 foot deep by approximately 2 feet wide. This will be sufficient to protect the slope from the erosive forces of storm water runoff. The reclaimed slopes will also be pocked to limit overland flow.

~~The other drainage, as mentioned above, will be constructed on the south end of the pad. The length of the channel is approximately 200 feet and the rise is approximately 50 feet equating in a slope of 4H:1V. With a slope this minor, it would not be advantageous for creating a design for this channel; however, the channel will be armored with rock riprap for extra protecting against erosion. Refer to any of the 110 series maps in the Maps Section for review.~~

Portal Backfilling

There are portals that provide access to underground workings of the Rockland Mine. They exist on the north side of the facility near the top of the access road. Refer to Map R106-1A for their locations. Figure 110.2-D illustrates how portals will be sealed and backfilled. Essentially, portals will be backfilled at least 10 feet inby the opening with overburden material. Backfilling will require approximately 63 cubic yard of material to complete. Highwall reclamation, as described above, will cover the backfilled openings completely and eliminate all access to underground workings.

R647-4-110.3 Post Mining Facilities

At the completion of mining and reclamation operations, all facilities, structures, piles, ponds, etc. will be reclaimed as outlined in the reclamation plan. No post mining structures or facilities will be left as part of the post mining land use for the Rockland Mine site.

R647-4-110.4 Acid Forming Material Disposition (Refer to table in Appendix C for segregated soil volume calculations)

The existing subsoil pile is located on the south side of the mine site. This stockpile contains approximately 4,269 cubic yards of material stored for use in reclamation. However, soil samples taken in 2005 and 2007(see analysis in Appendix D) indicate that there are acid forming materials (below pH of 6) in the top 1.0 feet of material on the south end of the pile. The extent of the acid forming materials is undetermined. However, for reclamation planning purposes, 20 feet on the south end of the pile will not be used as subsoil. This material, approximately 890 cubic yards, will be buried at the bottom of the highwall and covered with at least 2 feet of non-acid-forming material.

With the elimination of this acid-forming material from the subsoil balance the final total for usable subsoil equals 3,378 cubic yards. Paste pH tests will be conducted in the field during reclamation to ensure that no acid-forming materials will be used as a top cover. This field examination will also ensure that all suitable materials will be utilized to their fullest extent.

R647-4-110.5 Soil Redistribution and Revegetation

Soil redistribution depths have been calculated utilizing the known soil volumes in Appendix C and dividing by the areas needing covered. The depth of cover for subsoil material will be approximately six inches over all fill slopes as shown in Figure 110.2-C in the Figures Section. Depth of cover for topsoil resources amounts to only 1 inch over fill slopes. Topsoils stored and segregated on-site contain ditritus materials mixed within. This vegetative debris should enhance the quality and structure of this material making it a suitable growth medium.

Soil Redistribution

~~As mentioned in above,~~ Native overburdedn removed to mine the humic shale will be used as initial fill to backfill and eliminate, to the extent possible, all highwall areas. During reclamation, this material will be field analyzed to insure material quality. Material that tests with a pH below 6 or above 9 will be buried with at least 2.0 feet of non-toxic material.

As mentioned in the Operation Plan, "A portion of the subsoils are used to create a safety berm around the perimeter of the mine pad." Prior to redistributing the materials in the subsoil pile, the safety berm will be segregated by storing in a location so as not to interfere with backfilling activities. Over the life of the mining operations, these soils established a vegetative cover. Using these soils as a fill closer to the final surface could help in the establishment of final vegetation.

Dozers will be used to push soil materials in place. Initially, all deleterious material will be used as backfill at the bottom of the highwall areas. Fill material will be excavated from the outslope using a track-hoe and placed on the pad area. A dozer will push this material in place over the deleterious material backfilling the highwall and creating the initial contour. Subsoil segregated and stored on-site as well as the safety berm material will be placed at a depth of 6 inches on top of the fill material.

Boulders that have been stored on-site and used during mining operations will be collected and placed randomly on the reclaimed slope. The boulders will be placed in such a way as to mimic the surrounding undisturbed area and create habitat and shelter for small mammals.

After boulder placement, topsoil will be spread adequately to provide a depth of approximately 1 inch of cover. This will be the final contour. Analysis of subsoil and topsoil can be reviewed in Appendix D.

Utilizing a track-hoe, deep gouges will be randomly placed throughout the grade of the final contour. Deep gouges are constructed to retain moisture, minimize erosion and create and enhance wildlife habitat. Seeding will immediately follow the deep gouging process.

Revegetation

Seeding will take place as contemporaneously as is practical following contouring and deep gouging of the area being reclaimed. The seed mixture will be applied by hand broadcasting or by mechanical means. Because of the roughened nature of the seed bed, it is impossible to hand rake the seed to cover the soil. However, by seeding immediately after roughening, the seeds will settle into the voids of the soil. As the soil settles, seeds will be buried.

The Division of Oil, Gas, and Mining suggested the seed mix outlined in Table 2. This seed mix will be applied to all reclaimed surfaces at a rate of approximately 15 lbs/ac.

Table 2: Seed Mix For Rockland Mine Reclamation

Common Name	*Scientific Name*	*Lbs PLS/Acre*
Gardner Saltbrush	*Atriplex gardneri*	*3*
Shadscale	*Atriplex confertifolia*	*2*
Fourwing Saltbrush	*Atriplex canescens*	*2*
Russian Wild Rye	*Elymus juncea*	*4*
Indian Ricegrass	*Oryzopsis hymenoides*	*3*
Kochia	*Kochia prostrata*	*0.5*
	Total	***14.5***

After the seed is applied, the entire area will be hydromulched with a wood fiber or other acceptable mulch. The mulch will be applied at a rate of 2000 lbs./ac. for cover and protection.

Performance Standards for Vegetative Growth

Revegetation will be considered successful when growth has achieved 70 percent of the pre-mining vegetative ground cover. In the case of the Rockland Mine, success standards will be compared to the adjacent undisturbed areas as detailed by the vegetation survey in Appendix E. Vegetation must establish over a period of three years following the last seeding to be considered successful.

When the above standards have been met, the Division will determine that the revegetation work has been satisfactorily completed within practicable limits and approve release of the applied surety or incremental amount thereof.

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Rockland Mine

R647-4-113: Surety

Replace page 1

R647-4-113 SURETY

~~After receiving notification that the notice of intention has been approved, the Rockland Mine commits to providing to the Division a detailed bond estimate. The bond estimate will be based upon (a) the technical details of the approved mining and reclamation plan, (b) the proposed post mining land use, and (c) projected third party engineering and administrative costs to cover Division expenses incurred under a bond forfeiture circumstance.~~

Bond estimates were calculated utilizing the 2008 RSMeans Heavy Construction Cost Data, 22nd Annual Edition. Unit cost indices are calculated on earthwork and hydromulching operations. The line number references are given for each activity for easy review in RSMeasns data book. Total bond estimates for 2008 are $108,240.00. With an escalation factor of 3.8% for 5 years, the bond estimate in 2013 is $130,430.00. A surety bond for this amount is provided and payable to the Utah Division of Oil, Gas, and Mining. A copy of the surety is provided in Appendix I.

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Rockland Mine

R647-4-113: Surety

Add Bond Estimate (3 pages)

Bond Calculations Rockland Mine			
Direct Costs			
Subtotal Demolition		0	
Subtotal Earthwork	$	70,693.41	
Subtotal Revegetation	$	13,703.92	
Direct Costs Total	**$**	**84,397.33**	
Indirect Costs			
General Site Clean-Up	$	843.97	1.00%
Contractor Overhead and Profit	$	8,439.73	10.00%
Reclamation Management	$	6,118.81	7.25%
Contingency	$	8,439.73	10.00%
Indirect Costs Total	**$**	**23,842.25**	
2008 Total Costs	**$**	**108,239.58**	
Escalation Factor			3.80%
Number of Years			5
Escalation	$	22,189.03	
2013 Reclamation Costs for Rockland Mine	**$**	**130,428.61**	

Means Unit Cost

Line Number	Equipment	Crew	Daily Output	Labor Hours	Unit	Material	Labor	Equip	Total	Total Incl O&P
01 54 36.50.0100	Mob/Demob Dozer (for 50 mi RT)	B-34K	3	2.667	EA		$ 61.00	$110.00	$171.00	$ 217.00
01 54 36.50.0020	Mob/Demob Excavator (for 50 mi RT)	B34N	4	2	EA		$ 81.50	$207.00	$288.50	$ 355.00
01 54 36.50.2500	For each additional 5 miles distance (70 mi RT)						10%	10%		
31 2316.46.5020	300 hp Dozer, Common Earth, 100' Haul	B-10M	1650	0.007	BCY		$ 0.27	$ 0.84	$ 1.11	$ 1.34
31 2316.42.0300	Excavating, Common Earth, 3 yd Bucket	B-12D	2080	0.008	BCY		$ 0.27	$ 1.12	$ 1.39	$ 1.66
31 3713.10.0200	Riprap, machine placed for slope protectino	B-12G	62	0.258	LCY	26.5	$ 9.20	$ 10.35	$ 46.05	$ 55.00

Estimated Costs

Item	Quantity	Unit	Costs
Mob/Demob	4	EA	$ 3,308.40
Dozer	32,705.60	BCY	$ 36,303.22
Excavator @ 25% of Total Quantity	8,176.40	BCY	$ 11,365.20
Riprap	500	LCY	$ 23,025.00
Total			$ 70,693.41

Seeded Area 6.84 acres

Pocking

This cost is added to the excavating cost in the earthwork. **No additional cost here.**

Seed Mix for Rockland Mine

Common Name	Scientific Name	lbs PLS/ac	$/LB	$/AC	Total
Gardner Saltbrush	*Atriplex gardneri*	3	$ 13.00	$ 39.00	$ 266.76
Shadscale	*A. confertifolia*	2	$ 10.50	$ 21.00	$ 143.64
Fourwing Saltbrush	*A. canescens*	2	$ 5.00	$ 10.00	$ 68.40
Russian Wildrye	*Elymus juncea*	4	$ 2.75	$ 11.00	$ 75.24
Indian Ricegrass	*Oryzopsis hymenoides*	3	$ 9.00	$ 27.00	$ 184.68
Kochia	*Kochia prostrata*	0.5	$ 5.00	$ 2.50	$ 17.10
	TOTALS	14.5	$ 45.25	$ 110.50	**$ 755.82**

Hydromulch

						2008 Bare Costs				
Line Number	Equipment	Crew	Daily Output	Labor	Unit	Material	Labor	Equipment	Total	Total Incl O&P
32 92.19.0200	Synthetic Erosion Control, Soil Sealent, Sprayed from Truck	B-81	80	0.3	MSF	$ 26.50	$ 10.05	$ 6.90	$ 43.45	$ 52.00

Estimated Costs

Item	Quantity	Unit	Total
Pocking	6.84 (added with earthwork)	AC	$ -
Seed	6.84	AC	$ 755.82
Hydromulch	298	MSF	$ 12,948.10
	TOTAL		**$ 13,703.92**

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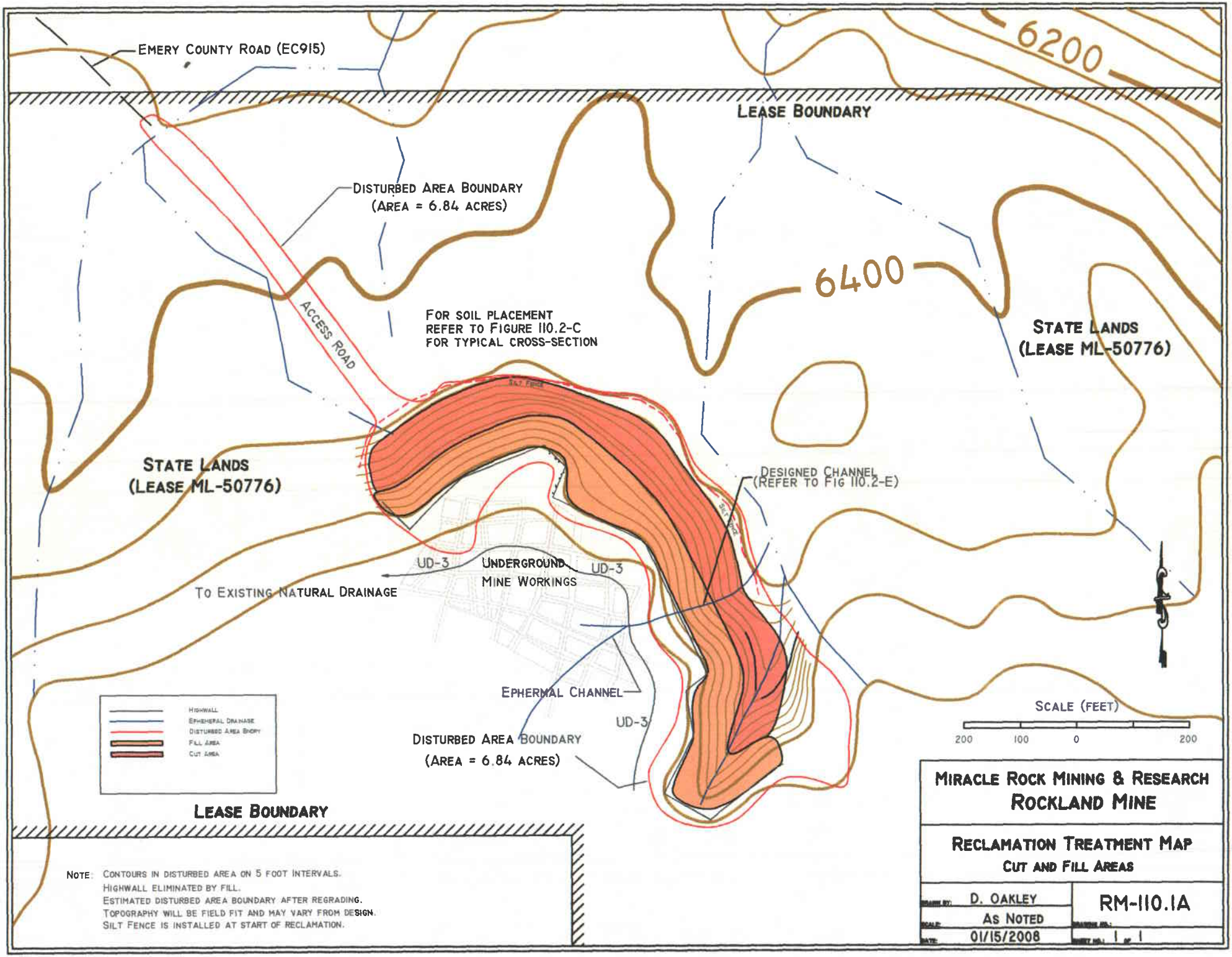
Rockland Mine

Maps Section

Replace Maps RM-110.1A, RM-110.2A, RM-110.3A, and RM-110.4A

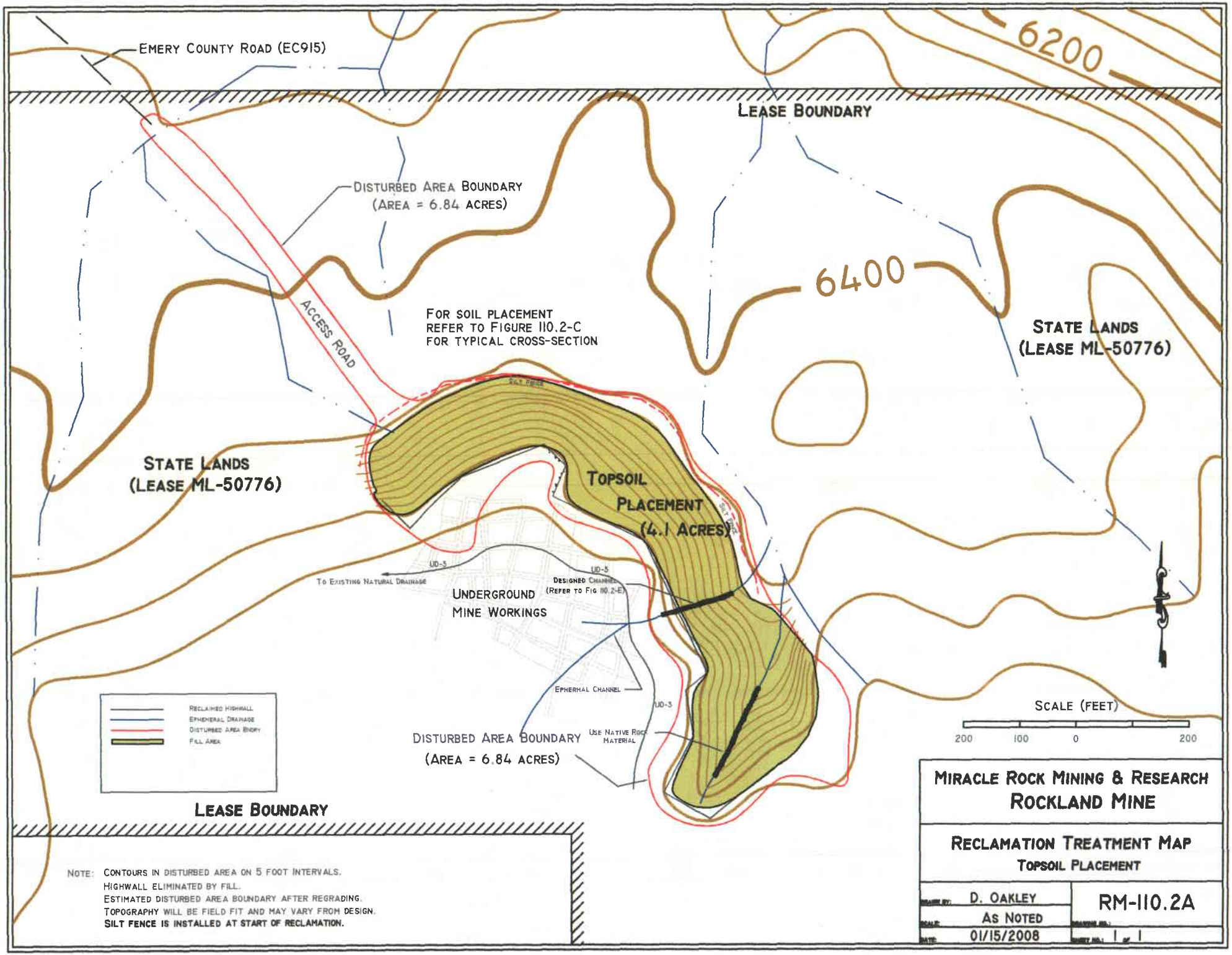


NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
HIGHWALL ELIMINATED BY FILL.
ESTIMATED DISTURBED AREA BOUNDARY AFTER REGRADING.
TOPOGRAPHY WILL BE FIELD FIT AND MAY VARY FROM DESIGN.
SILT FENCE IS INSTALLED AT START OF RECLAMATION.

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

RECLAMATION TREATMENT MAP
CUT AND FILL AREAS

DRAWN BY:	D. OAKLEY	RM-110.1A
SCALE:	AS NOTED	
DATE:	01/15/2008	SHEET NO.: 1 OF 1



NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
HIGHWALL ELIMINATED BY FILL.
ESTIMATED DISTURBED AREA BOUNDARY AFTER REGRADING.
TOPOGRAPHY WILL BE FIELD FIT AND MAY VARY FROM DESIGN.
SILT FENCE IS INSTALLED AT START OF RECLAMATION.

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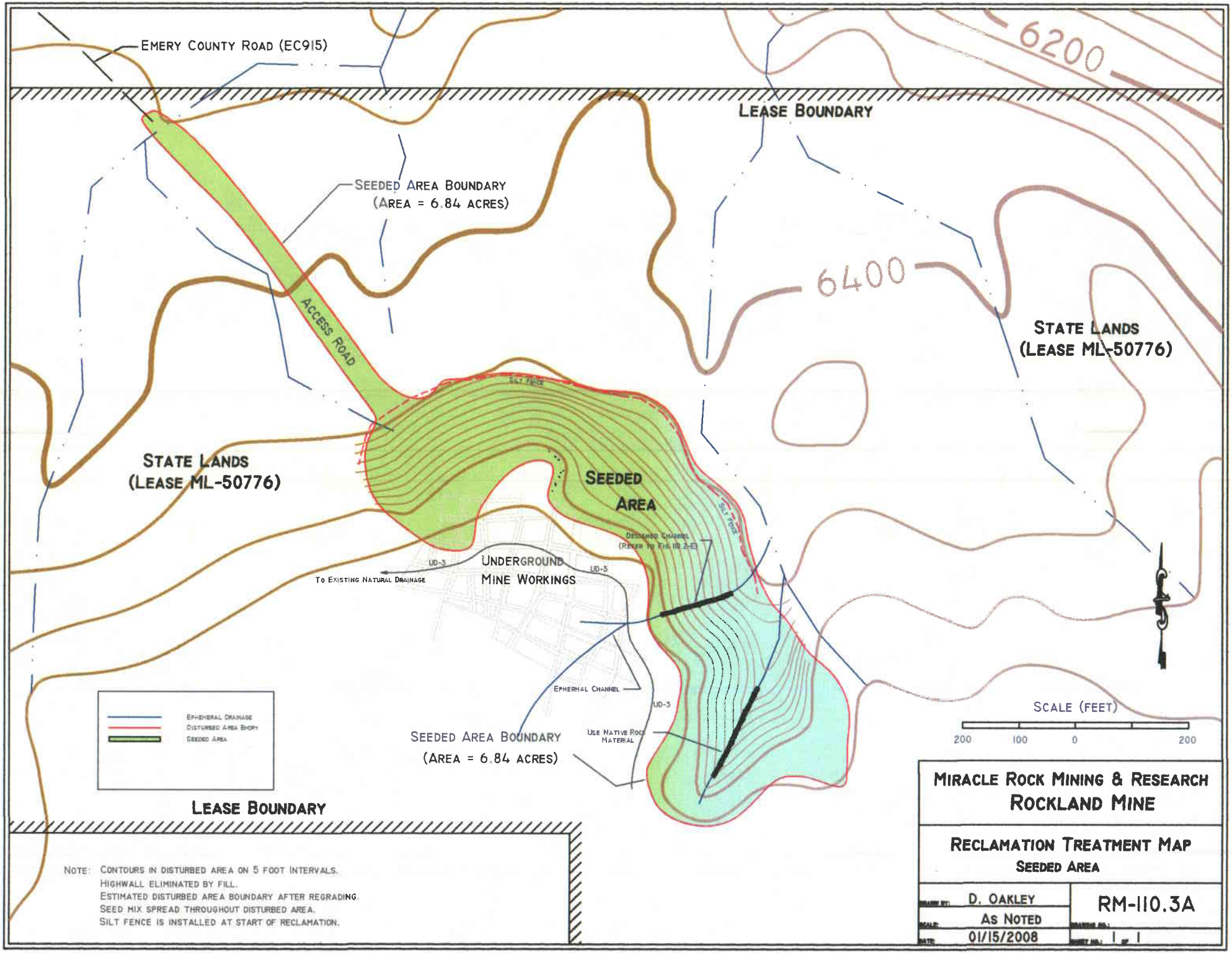
RECLAMATION TREATMENT MAP
TOPSOIL PLACEMENT

DRAWN BY:	D. OAKLEY	RM-110.2A
SCALE:	AS NOTED	DRAWING NO.:
DATE:	01/15/2008	SHEET NO.: 1 of 1

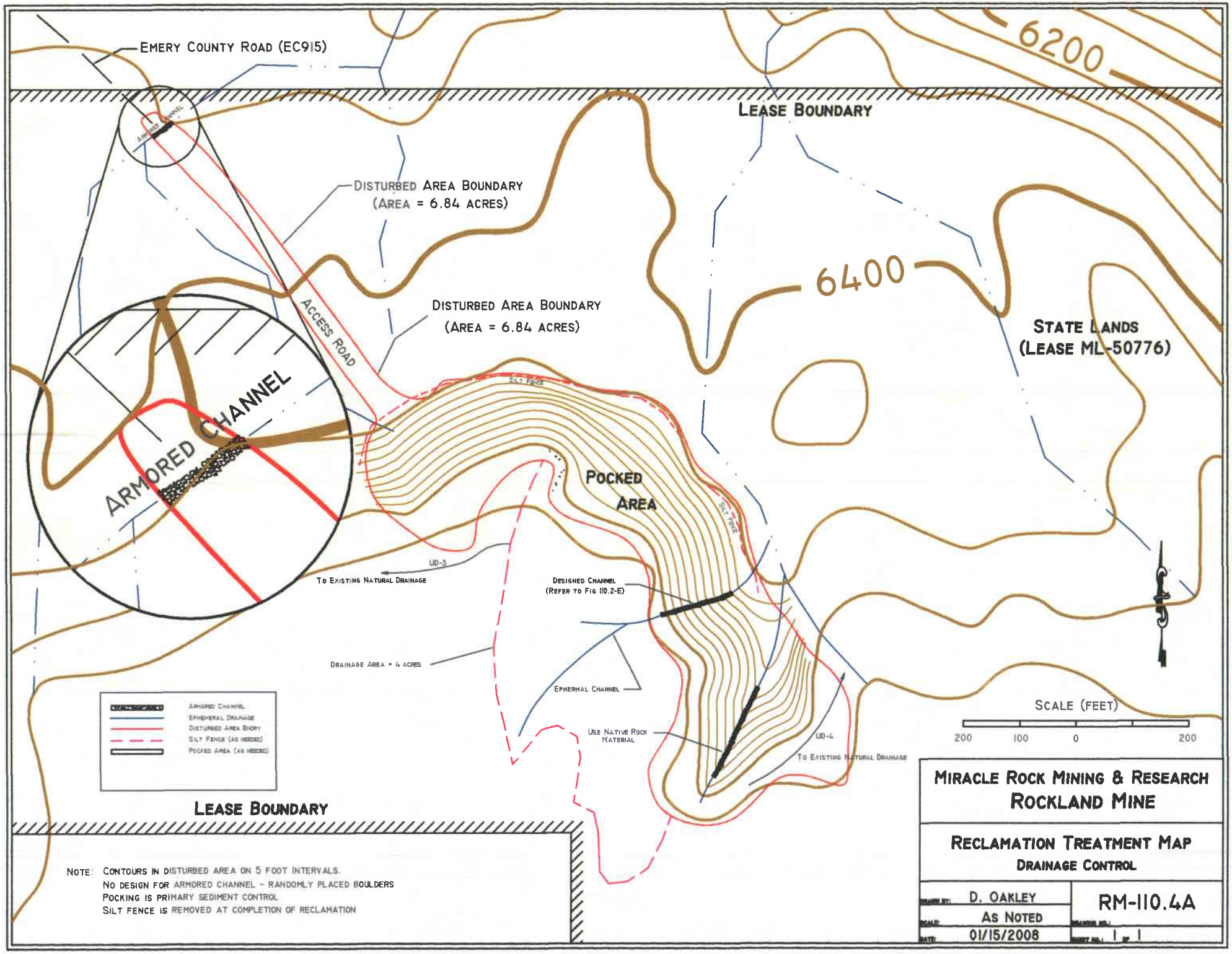


NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
HIGHWALL ELIMINATED BY FILL.
ESTIMATED DISTURBED AREA BOUNDARY AFTER REGRADING.
SEED MIX SPREAD THROUGHOUT DISTURBED AREA.
SILT FENCE IS INSTALLED AT START OF RECLAMATION.

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

RECLAMATION TREATMENT MAP
SEEDED AREA

DRAWN BY:	D. OAKLEY	RM-110.3A
SCALE:	AS NOTED	DRAWING NO.:
DATE:	01/15/2008	SHEET NO.: 1 OF 1



NOTE: CONTOURS IN DISTURBED AREA ON 5 FOOT INTERVALS.
NO DESIGN FOR ARMORED CHANNEL - RANDOMLY PLACED BOULDERS
POCKING IS PRIMARY SEDIMENT CONTROL
SILT FENCE IS REMOVED AT COMPLETION OF RECLAMATION

Miracle Rock Mining & Research

Rockland Mine

Appendix Section

Replace Appendix E

(Vegetation Cover Estimates)

Ocular Vegetation Estimate

Transect #	Cover Type	%	Transect #	Cover Type	%
#1	Vegetation	0	#11	Vegetation (Grass)	15
	Litter (Dead Mohogany Brush)	20		Litter	0
	Bare Ground	80		Bare Ground	85
	Canopy	0		0% Canopy	0
	1/4" Topsoil			3" Topsoil	
#2	Vegetation	0	#12	Vegetation (Grass)	4
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	96
	Canopy	0		Canopy	0
	1/4" Topsoil			1" Topsoil	
#3	Vegetation	0	#13	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	100
	Canopy	0		Canopy (Juniper)	50
	1" Topsoil			6" Topsoil	
#4	Vegetation	0	#14	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	100
	Canopy	0		Canopy (Juniper)	100
	1 1/2" Topsoil			3" Topsoil	
#5	Vegetation	0	#15	Vegetation (Rabbit Brush)	10
	Litter	0		Litter	0
	Bare Ground	20		Bare Ground	80
	Canopy (Pinion)	80		Canopy	10
	3" Topsoil			6 1/2" Topsoil	
#6	Vegetation (Rabbit Brush)	4	#16	Vegetation (Grass)	2
	Litter	0		Litter	0
	Bare Ground	31		Bare Ground	98
	Canopy (Juniper)	65		Canopy	0
	3" Topsoil			3" Topsoil	
#7	Vegetation (Sage Bush)	2	#17	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	18		Bare Ground	40
	Canopy (Juniper)	20		Canopy (Juniper)	60
	3 1/2" Topsoil			1" Topsoil	
#8	Vegetation (Fourwing)	1	#18	Vegetation (Grass)	0.5
	Litter	0		Litter	0
	Bare Ground	99		Bare Ground	99.5
	Canopy	0		Canopy	0
	3" Topsoil			2" Topsoil	
#9	Vegetation (Rabbit Brush)	15	#19	Vegetation (Brigham Tea)	2
	Litter	0		Litter	0
	Bare Ground	85		Bare Ground	98
	Canopy	0		0% Canopy	0
	3" Topsoil			1 1/2" Topsoil	
#10	Vegetation	0	#20	Vegetation	0
	Litter	0		Litter	0
	Bare Ground	100		Bare Ground	100
	Canopy	100		Canopy	0
	0 " Topsoil			1/4" Topsoil	

Cover Estimates	%
Vegetation (perennial grass, forb and shrub cover)	2.78
Litter	1.00
Bare Ground	81.475
Rock/Rock Fragments	0.00
Canopy	24.25
Total Cover Estimates	19.62
Revegetation Requirements (70% of above vegetation figure)	18.92

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Rockland Mine

Appendix Section

Add Appendix F (SWPPP)

Appendix G (Hydrograph)

Appendix H (Channel Design Dimensions)

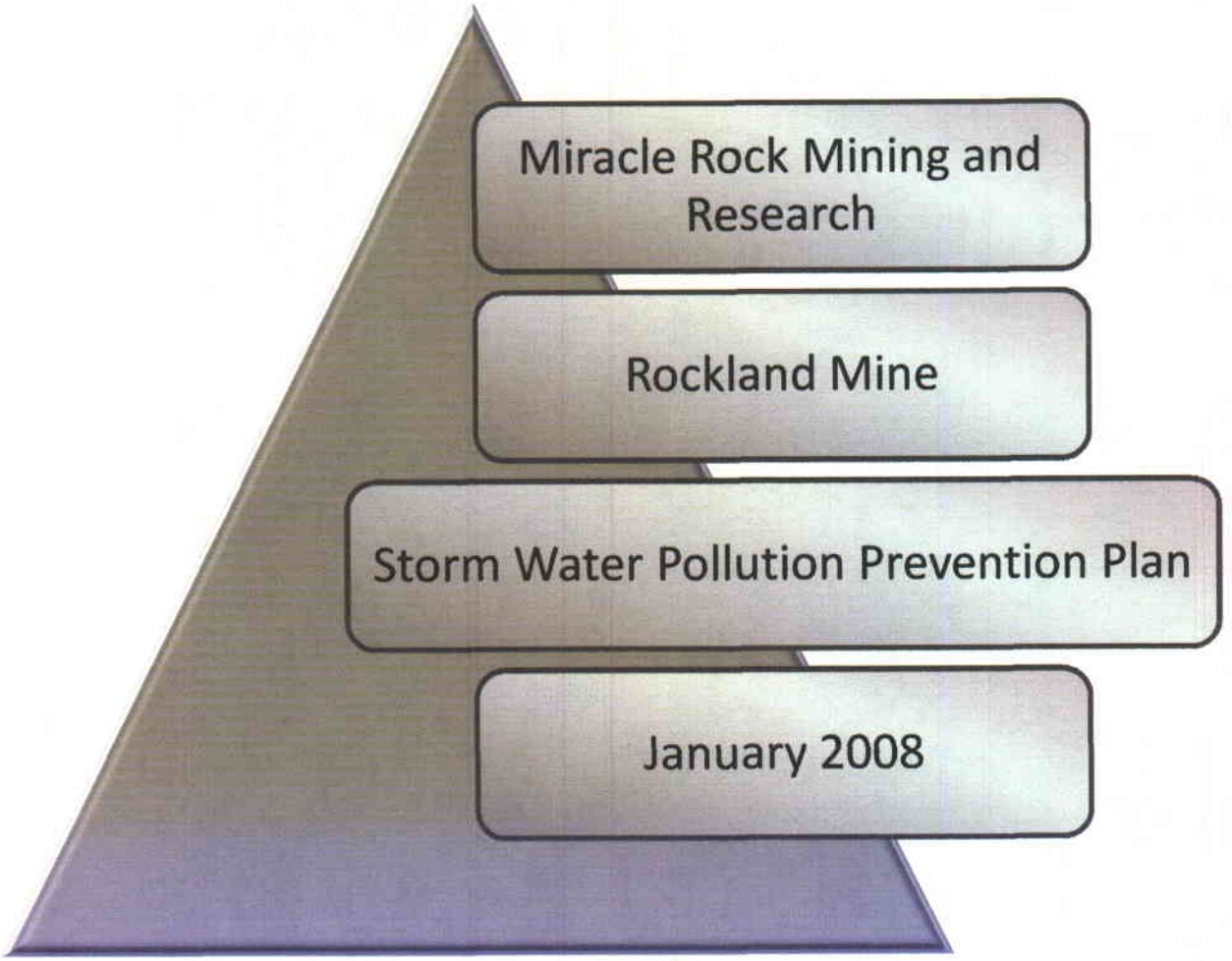
Appendix I (Surety Bond Documents)

Rockland Mine

Appendix F

Storm Water Pollution Prevention Plan

(SWPPP)



Prepared by Dennis Oakley, Consultant

January, 2008

Introduction

According to the storm water regulations in the State of Utah, the Rockland Mine facility falls under Group J (Storm water discharges associated with industrial activity from mineral mining and processing facilities). Requirements from Group J call for operators to develop a storm water pollution prevention plan. This document details the storm water management controls and implementation of such controls

1.0 Pollution Prevention Team

The plan shall identify a specific individual or individuals within the facility organization as members of a Storm Water Pollution Prevention Team that are responsible for developing the storm water pollution prevention plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

Team members include:

Name	Position

2.0 Description of Potential Pollutant Sources

This plan provides a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges of which may result in the discharge of pollutants during dry weather from storm water structures draining the facility. The potential sources of storm water pollution have been identified by in preparation of this plan, which could reasonably be expected to contribute to runoff from the facility. An on-site drainage map of all surface facilities and drainage routes is provided in Appendix A.

2.1 On-Site Drainage

The Drainage Control Map illustrates drainage direction of runoff, drainage control structures and discharge points from all applicable facility-related areas. Culverts, discharges from equipment and maintenance areas subject to storm runoff, locations of existing erosion and sedimentation control structures, receiving streams, locations of fuel

storage tanks, and locations of fueling station areas that are exposed to precipitation are also identified on this map.

2.2 Inventory of Exposed Materials

An inventory of the materials handled at the Rockland Mine that is potentially exposed to precipitation are listed in Table 1. The total inventory includes:

- Description of significant materials that have been handled, stored or disposed in a manner to allow exposure to storm water runoff.
- Method and location of on-site storage or disposal.
- Materials management practices employed to minimize contact of materials with storm water runoff
- The location and description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff
- Description of any treatment the storm water receives

Table 1: Material inventory of potential pollutants at the Rockland Mine Facility.

Material	Location	Quantity Used, Produced, or Stored	Potential Contact with Storm Water (Low, Med., High)	Materials Management Practice
Diesel Fuel	See Surface Facility Map in Appendix A	500 gallon maximum	med	Secondary Containment
Storage of Oils and Grease	See Surface Facility Map in Appendix A	Varies	low	Oil and grease containers are stored in the storage building
Trash	See Surface Facility Map in Appendix A	Varies	low	Trash removed from site after mining activities

Table 1 above will be updated from time to time to provide an accurate inventory of potential pollutants within the boundaries of the Rockland Mine facility.

2.3 Significant Spills and Leaks

Over the past three (3) years, there have been no significant spills or leaks reported at the Rockland Mine facility. In the event that a significant spill of leak occurs, this section will be updated.

2.4 Sampling Data

No historic sampling data for storm water discharges exist for the Rockland Mine. All future sampling data for the Rockland Mine site will be in accordance with Appendix II.J.5 of the Multi-Sector General Permit for Storm Water Discharges. This data will also be at the mine's main office in Emery, Utah.

2.5 Risk Identification and Summary of Potential Pollutant Sources

This section describes potential pollutant sources which currently exist on the Rockland Mine site. The location of these areas can be found by referencing the Surface Yard Map in Appendix A. These areas have a low risk of adding significant amounts of pollution to storm water discharges since all drainage from these areas are directed into an impoundment structure.

Fueling Facilities – Fueling facilities are located at the portal and ramp platform area. These facilities have a relatively high potential of exposure to storm water runoff even though the diesel fuel tank is fully contained. Spills may occur during refilling of the diesel fuel tank as well as equipment filling procedures unless strict care is taken. Spills of fuel that have contact with the ground will mix with storm water unless cleanup is conducted immediately.

The risk of fuel spills coming into contact with waters of the state is minimal because of the BMP's utilized on-site. BMP's are discussed later in this plan.

Oils and Grease – Oils and grease for equipment maintenance are stored on-site within an enclosed storage building (refer to Surface Facilities Map in Appendix A). As storage of oil has minimal risk of mixing with storm water, maintenance activities on the facilities pad increase the risk. Spilling of oils during these maintenance activities may occur unless strict care is taken. Spills of oil on the ground will mix with storm water unless cleanup is conducted immediately.

Trash – On-site storage of trash occurs only during mining activities. Since mining activities are not continuous at the Rockland Mine, potential for pollutants to come into contact with storm water are limited.

Trash (i.e. empty oil cans and grease tubes, boxes and other miscellaneous garbage) accumulates on the pad area in specified locations. These areas are

exposed to open elements and may mix with storm water during a precipitation event. All trash is removed from the facility and properly disposed of at the completion of all mining activities.

3.0 Measures and Controls

This plan develops a description of storm water management controls appropriate for the Rockland Mine to implement such controls. The appropriateness and priorities of controls in this plan reflect already identified potential sources of pollutants at the facility. A description of the storm water management controls address the following components:

- Good Housekeeping
- Preventive Maintenance
- Spill Prevention and Response Procedures
- Inspections
- Employee Training
- Record-keeping and Internal Reporting Procedures
- Non-storm Water Discharges
- Sediment and Erosion Control
- Management of Runoff

3.1 Good Housekeeping

Good housekeeping requires the maintenance of areas that may contribute pollutants to storm water discharges in a clean, orderly manner. As mentioned above, trash accumulates at specified locations on the mine pad. At the completion of mining activities all trash is disposed of at a certified landfill.

3.2 Preventative Maintenance

A preventive maintenance program involves timely inspection and maintenance of storm water management devices as well as inspecting and testing equipment and systems that may exist to uncover conditions that cause breakdowns or failures resulting in discharges of pollutants to surface waters.

Inspections of BMP's throughout the mine site, such as berms and impoundments, ensure proper diversion and treatment of runoff. If BMP's are found to be inefficient to control and treat runoff, they will be scheduled to be immediately repaired.

3.3 Spill Prevention and Response Procedures

In the case of spills of fuel or oil at the fueling or maintenance areas, the procedures outlined below will be followed.

Spill Prevention – Oil and fuel storage tanks will be inspected periodically for signs of leads, distortion, corrosion, etc. Any problem noted will be documented and scheduled for follow up action.

All tank filling operations will be supervised by qualified personnel to assure spill precaution practices are followed and that response is immediate in the event of a leak or discharge. Spill prevention equipment, such as covers, caps, gaskets, pumps, containment, valves and fittings will be maintained and operated in a manner that will prevent failures, leaks, spills or other incidents that could result in the release of oil.

Employees of Rockland Mine are trained in the spill prevention, maintenance, and response procedures to minimize or eliminate environmental damage as a result of a spill.

Response Procedures – In the case of a spill or release, immediate action should be taken to contain the spill. Containment measures include plugging the leak, diking, putting down absorbent material, digging a trench, closing stop valve, etc. **IT IS OF PRIMARY IMPORTANCE THAT OIL IS NOT ALLOWED TO LEAVE THE SITE AND/OR ENTER ANY WATERWAY.** If the spilled material does leave the company property, immediate efforts must be made to place appropriate absorbent materials in watercourses or drains, to minimize damage.

Clean up of small spills and leaks – Small spills and leaks will be cleaned up with an absorbent material. Once the fuel or oil is confined and absorbed, it will be containerized and disposed of in an appropriate manner off-site.

Clean up of large spills and leaks – Large spills and leaks, such as the spilled contents of the fuel storage tank, will be handled first to contain the spill to the immediate area. On-site equipment may need to be used to construct berms, trenches, or impoundments. Berms or trenches will be constructed to prevent spreading of pollutants. Impoundments will be constructed to confine the liquid for clean up.

Once the liquid is confined and controlled, an absorbent material, such as dirt, will be used to soak up the liquid. Rags, pads, pillows, etc. will be used to clean up all residual traces of the spill. Once all the pollutant has been removed from the surface as best as possible, the ground will be inspected for penetration of pollutants. All materials used to clean up the spill, as well as, contaminated soil will be removed from the site and taken to an approved landfill

3.4 Inspections

Inspections of all storm water control facilities are conducted on a quarterly basis at the Rockland mine. These inspections are conducted to verify the integrity of each structure, ensure erosion is being controlled on all slopes, and to check fueling and oil storage areas and waste disposal areas for evidence of discharges of contaminated storm water.

3.5 Employee Training

Employees will be trained periodically of all components of the storm water pollution prevention plan. Discussions will focus on spill prevention measures, good housekeeping, and spill response procedures. Training of employees will be conducted at least annually. Records of such training are noted in Appendix B.

3.6 Recordkeeping and Internal Reporting Procedures

Records of all spills, discharges, quality and quantity of discharges, inspections and maintenance activities which is conducted on storm water control structures or fueling and oil storage facilities will be maintained in Appendix C These records will be updated annually to ensure a consistent and proactive approach to prevent contamination of storm water discharges.

3.7 Non-Storm Water Discharges

No water sources that could cause a non-storm water discharge exist at the Rockland Mine.

3.8 Sediment and Erosion Control

Sediment control measures have been implemented on the disturbed area to minimize additional contributions of sediment solids to the receiving drainage. Best management practices are used to control erosion and sedimentation from mining operations. BMP's include some of the following controls; berms, impoundments, straw bales, silt fences, etc. Surface water quality will be protected by handling earth materials and runoff in a manner that minimizes the potential for pollution. Specifications for BMP installation are detailed in Appendix D.

Analysis of the stored overburden samples tested has shown that toxic materials (low pH) are present on-site. Discharges if any, of water from areas disturbed by mining and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for mineral mining promulgated by the EPA set forth in 40CFR Part 434.

3.9 Management of Runoff

As shown on the Drainage Control Map (Appendix A), there are two undisturbed ephemeral drainages adjacent to the disturbed area that could potentially be impacted by runoff from the disturbed area. The drainages are noted as UD-1 and UD-2. Disturbed areas that flow into these drainages are noted on the Map as DA-1 and DA-2. A third ditch, UD-3, is located above the highwall and diverts undisturbed runoff away from the mine site. Each area is discussed below. Runoff volumes from these areas have been calculated and best management practices (BMP's) have been designed accordingly.

Disturbed Area 1 (DA-1)
The mine pad area consists of hydrologic area DA-1. Its size is approximately 3.4 acres. All flow is confined to the pad and impoundment area. Any precipitation that falls onto the mine pad either puddles or flows as indicated by the flow lines on Map R107-1A. Runoff volumes have been calculated for the pad area using a 10 year/24 hour precipitation event of 1.51 inches. Peak discharge from the pad is 0.15 ac/ft.

Disturbed Area 2 (DA-2)
The area below the mine pad where material has been cast off the side slope consists of the hydrologic area DA-2. The material consists mainly of pebble to boulder sized rock and is highly permeable. No erosional effects have been indicated on the surface of these slopes. BMP's will not be used at the toe of the slope until final reclamation.

Undisturbed Drainage (UD-1)
Flow from the mine pad flows into the impoundment located on the east side of the pad. Discharge from the impoundment is treated before flowing into UD-1. Drainage UD-1 drains into an un-named ephemeral drainage which eventually flows into the Muddy River.

Undisturbed Drainage (UD-2)
Overland flows (if any) from the mine pad slopes drain into UD-2. This undisturbed drainage flows directly into the Muddy River drainage system.

Undisturbed Diversion (UD-3)
Ditch UD-3 is a historic diversion ditch that was cut with a bulldozer along an existing road above the mine site. This ditch diverts undisturbed runoff away from the topsoil storage area and directs flow into a natural drainage system. The natural drainage, like others in the area, are ephemeral and flow as a result of precipitation events.

4.0 Comprehensive Site Compliance Evaluation

The site compliance evaluation will provide a basis for evaluating the overall effectiveness of the storm water pollution prevention plan. A comprehensive site compliance evaluation will be conducted at the Rockland Mine at least once annually. Qualified personnel will conduct the comprehensive site inspection to:

- Confirm the accuracy of the description of potential pollutant sources contained in the storm water pollution prevention plan
- Determine the effectiveness of the plan
- Assess compliance with the terms and conditions of the storm water permit

The evaluation will be performed by the Pollution Prevention Team. They may be accompanied by other employees who are familiar with the mining operations and the goals and requirements of the storm water pollution prevention plan.

The process for conducting the site evaluation will include reviewing the plan; developing a list of those items which are part of the material handling, storage, and transfer area covered by the plan; and reviewing the mine's past year operations to determine if any additional areas should be included in the plan. A site inspection will also be conducted to determine if all storm water pollution prevention measures are accurately identified in the plan and that they are in place and working properly. This site inspection should also be conducted during routine inspections to immediately alleviate any future problems caused by storm water runoff.

The results of the comprehensive site compliance evaluation will be documented in a report signed by an authorized company official and retained in Appendix C. The report will summarize the scope of the evaluation, personnel making the evaluation, date of evaluation, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance to Section 3.0 above. The report will be retained as part of the plan for at least three (3) years and will identify any incidents of non-compliance, or a certification that the facility is in compliance with the storm water pollution prevention plan and state permit.

The description of potential pollutant sources and storm water control measures may need to be revised based on the site inspection results of the areas contained in Section 3.0. If necessary, the plan will be revised within two weeks after the date of the inspection. These revisions will be noted in Appendix E. Changes in the control measures will be scheduled for implementation on site in a timely manner.

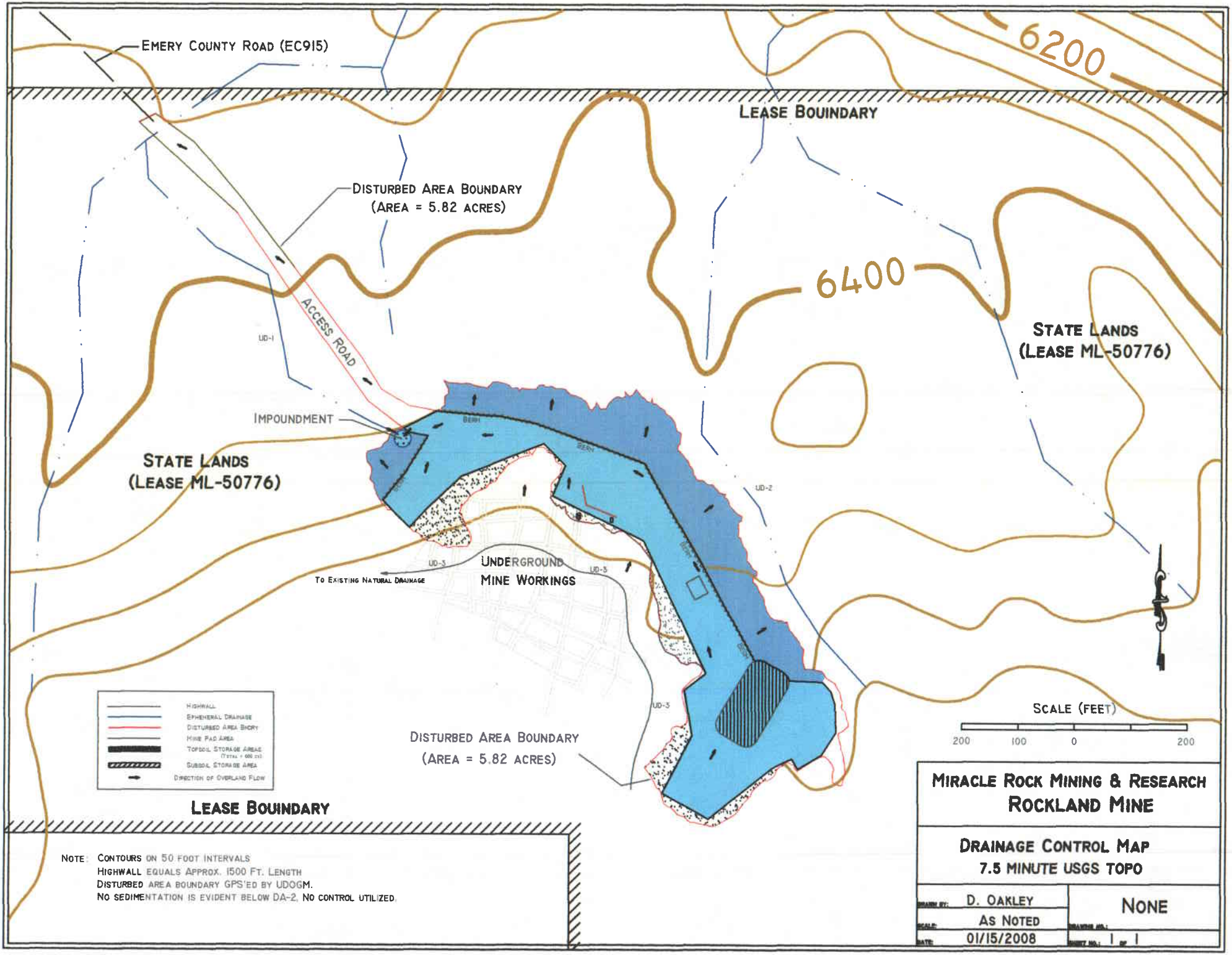
Rockland Mine

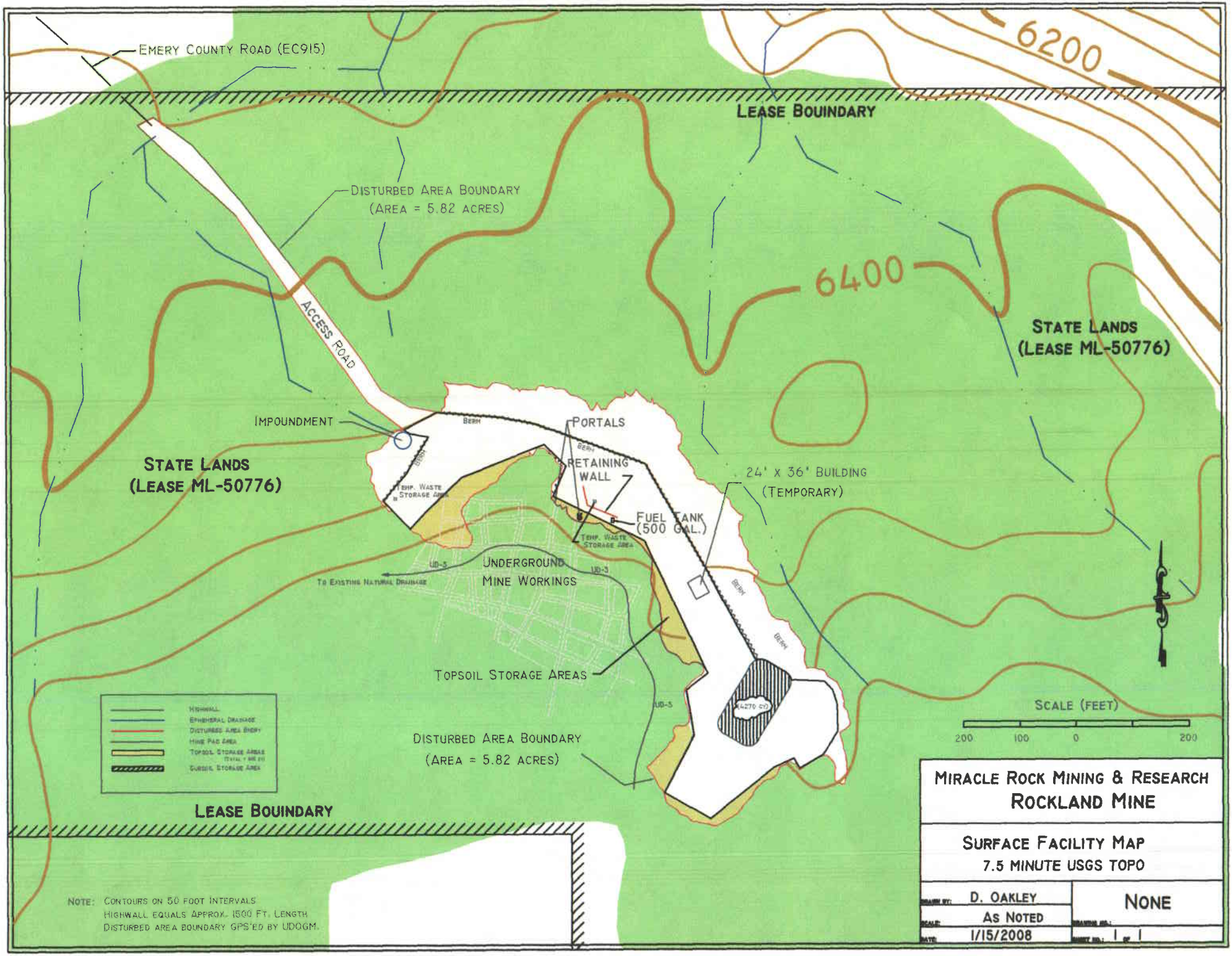
Storm Water Pollution Prevention Plan

Appendix A

Surface Facility Map

Drainage Control Map


EMERY COUNTY ROAD (EC915)
6200
LEASE BOUINDARY
DISTURBED AREA BOUNDARY
(AREA = 5.82 ACRES)
6400
ACCESS ROAD
UD-1
STATE LANDS
(LEASE ML-50776)
IMPOUNDMENT
BERM
STATE LANDS
(LEASE ML-50776)
UD-2
UD-3
UNDERGROUND
MINE WORKINGS
UD-3
TO EXISTING NATURAL DRAINAGE
UD-3
HIGHWALL
EPHEMERAL DRAINAGE
DISTURBED AREA BNDRY
MINE PAD AREA
TOPSOIL STORAGE AREAS
SUBSOIL STORAGE AREA
DIRECTION OF OVERLAND FLOW
DISTURBED AREA BOUNDARY
(AREA = 5.82 ACRES)
SCALE (FEET)
200
100
0
200
LEASE BOUINDARY
NOTE: CONTOURS ON 50 FOOT INTERVALS
HIGHWALL EQUALS APPROX. 1500 FT. LENGTH
DISTURBED AREA BOUNDARY GPS'ED BY UDOGM.
NO SEDIMENTATION IS EVIDENT BELOW DA-2, NO CONTROL UTILIZED.
MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE
DRAINAGE CONTROL MAP
7.5 MINUTE USGS TOPO
DRAWN BY: D. OAKLEY
SCALE: AS NOTED
DATE: 01/15/2008
NONE
DRAWING NO.:
SHEET NO.: 1 OF 1



NOTE: CONTOURS ON 50 FOOT INTERVALS
HIGHWALL EQUALS APPROX. 1500 FT. LENGTH
DISTURBED AREA BOUNDARY GPS'ED BY UDOGM.

Rockland Mine

Storm Water Pollution Prevention Plan

Appendix B

Training Records

Storm Water Pollution Prevention Plan
Training Records

Rockland Mine Site

Date	Persons Trained	Training Components			
		Spill Prevention	Spill Response	House-keeping	Material Management Practices

Rockland Mine

Storm Water Pollution Prevention Plan

Appendix C

Comprehensive Site Evaluation

Comprehensive Site Evaluation

Rockland Mine Site

Date:

Time:

Inspector:

Weather Conditions:

Area Inspected	Problems Noted	Corrective Action Needed	Date Completed

Rockland Mine

Storm Water Pollution Prevention Plan

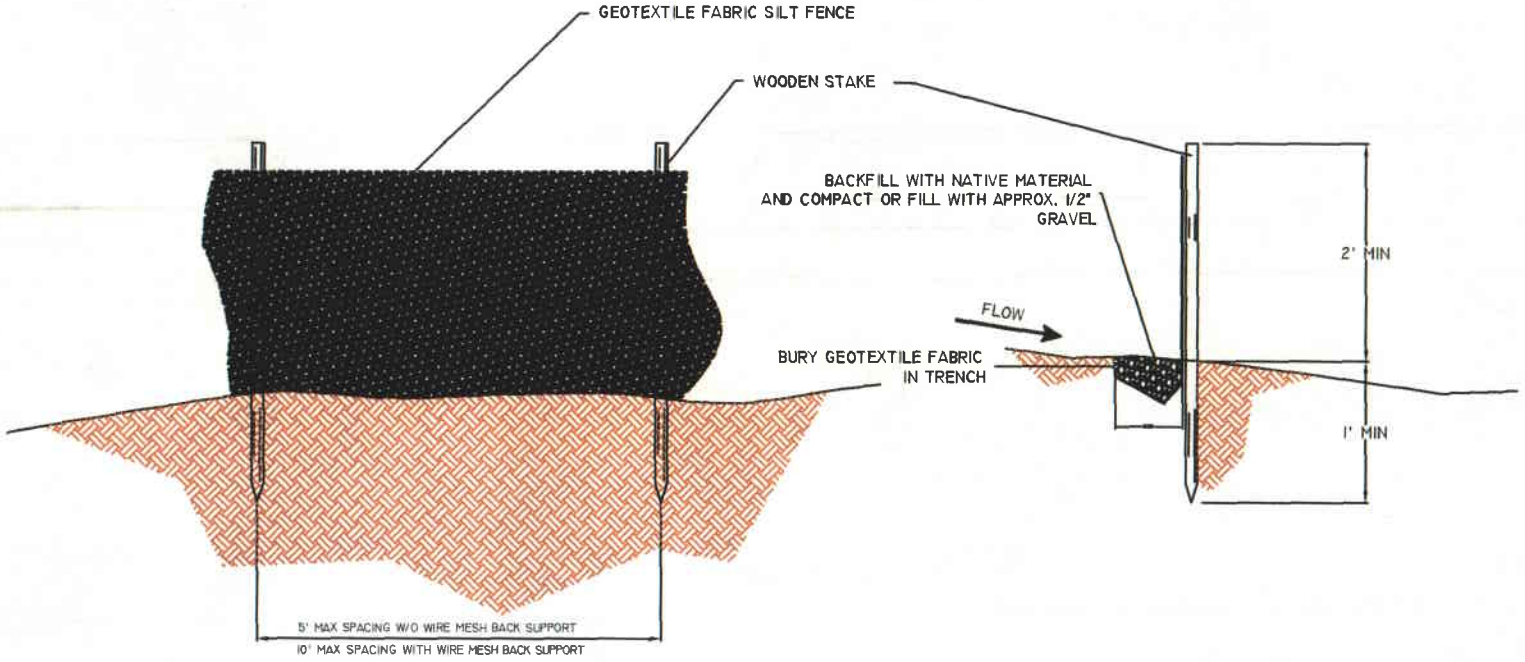
Appendix D

BMP Specifications

NOTES:
INSTALL SILT FENCE ALONG CONTOURS WHEN EVER POSSIBLE

WRAP ENDS SLIGHTLY UP-SLOPE TO PREVENT SEDIMENT FLOWING AROUND ENDS

PERFORM MAINTENANCE MONTHLY AND IMMEDIATELY AFTER STORMS

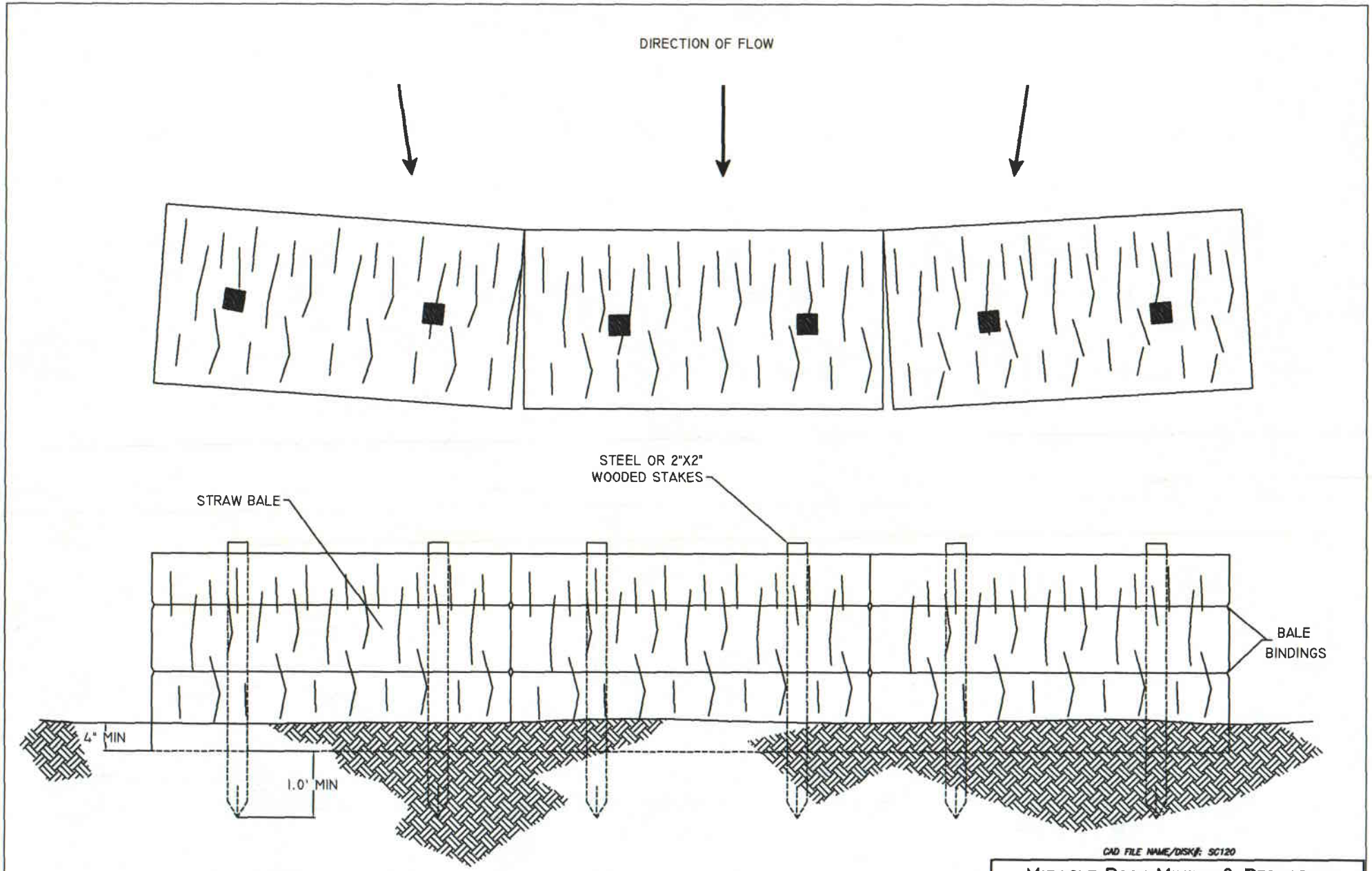


CAD FILE NAME/DISK#: SC110

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

SILT FENCE DETAIL
SWPPP BMP'S
TYPICAL DRAWING

DRAWN BY: DENNIS OAKLEY	SC110
SCALE: NONE	DRAWING #:
DATE: 3/7/2007	SHEET 1 OF 1 REV. —



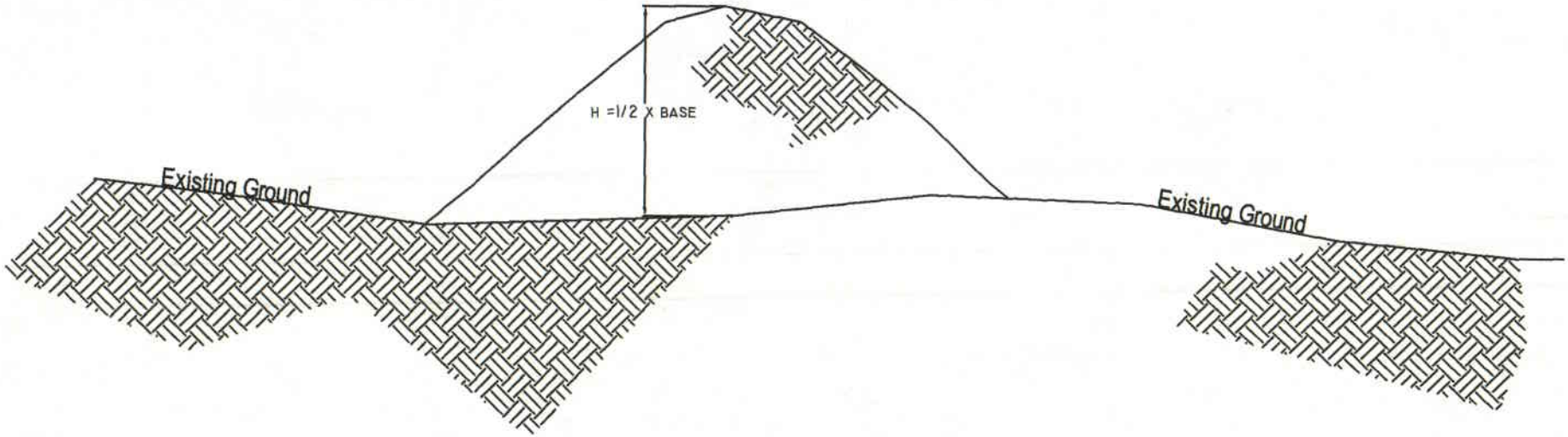
CAD FILE NAME/DISK#: SC120

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

STRAW BALES
SWPPP BMP'S
TYPICAL DRAWING

DRAWN BY: DENNIS OAKLEY	SC120
SCALE: NOT TO SCALE	DRAWING #:
DATE: 3/7/2007	SHEET 1 OF 1 REV.

NOTES:
INSURE TIGHTLY ABUTED ENDS TO ELIMINATE LEAKAGE
KEY BALES INTO GROUND TO PREVENT FLOW UNDER BALES
COMPACT EARTH MATERIAL AROUND BASE OF BALES
USE TWO STAKES PER BALE TO SECURE IN PLACE



NOTES:
HEIGHT EQUALS 1/2 WIDTH OF BASE
BERM IS SLIGHTLY COMPACTED FOR STABILITY
USE FOR SEDIMENT CONTAINMENT

CAD FILE NAME/DISK#: D202

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

BERM
SWPPP BMP'S
TYPICAL CROSS-SECTION

DRAWN BY: *DENNIS OAKLEY*	*D202*
SCALE: *NOT TO SCALE*	DRAWING #:
DATE: *3/7/2007*	SHEET 1 OF 1 REV.

Rockland Mine

Storm Water Pollution Prevention Plan

Appendix E

Revisions

Storm Water Pollution Prevention Plan
Revision Sheet

Rockland Mine Site

		Approvals*			
Date	Rev. #	1	2	Pages	Comments

* Approvals- (1) Management (2) Professional Engineer

Rockland Mine

Appendix G

Hydrograph

Project Title = Rockland1

WATERSHED HYDROGRAPH

-- Watershed data for watershed # 1

Curve number = 80.0

Area = 4.0 acres

Hydraulic length = 400.00 feet

Elevation change = 5.0 feet

Concentration time = 0.06 hours

Unit hydrograph type = Forested

-- Total Area = 4.0 acres

-- Storm data

Total precipitation = 2.5 inches

Storm type = SCS Type 2 storm, 24 hour storm

Peak Discharge = 1.83 cfs

Discharge volume = 0.29 acre ft

time	rainfall	hydrograph	time	rainfall	hydrograph
(hr.)	(in.)	(cfs)	(hr.)	(in.)	(cfs)
0.00	0.000	0.000 *	0.20	0.005	0.000
0.40	0.005	0.000 *	0.60	0.005	0.000
0.80	0.005	0.000 *	1.00	0.005	0.000
1.20	0.006	0.000 *	1.40	0.006	0.000
1.60	0.006	0.000 *	1.80	0.006	0.000
2.00	0.006	0.000 *	2.20	0.006	0.000
2.40	0.006	0.000 *	2.60	0.006	0.000
2.80	0.006	0.000 *	3.00	0.006	0.000
3.20	0.007	0.000 *	3.40	0.007	0.000
3.60	0.007	0.000 *	3.80	0.007	0.000
4.00	0.007	0.000 *	4.20	0.008	0.000
4.40	0.008	0.000 *	4.60	0.008	0.000
4.80	0.008	0.000 *	5.00	0.008	0.000
5.20	0.008	0.000 *	5.40	0.008	0.000
5.60	0.008	0.000 *	5.80	0.008	0.000
6.00	0.008	0.000 *	6.20	0.010	0.000
6.40	0.010	0.000 *	6.60	0.010	0.000
6.80	0.010	0.000 *	7.00	0.010	0.000

time (hr.)	rainfall (in.)	hydrograph (cfs)	time (hr.)	rainfall (in.)	hydrograph (cfs)
7.20	0.010	0.000 *	7.40	0.010	0.000
7.60	0.010	0.000 *	7.80	0.010	0.000
8.00	0.010	0.000 *	8.20	0.013	0.000
8.40	0.013	0.000 *	8.60	0.013	0.000
8.80	0.014	0.000 *	9.00	0.014	0.000
9.20	0.016	0.000 *	9.40	0.016	0.000
9.60	0.017	0.000 *	9.80	0.018	0.000
10.00	0.018	0.000 *	10.20	0.023	0.000
10.40	0.023	0.000 *	10.60	0.027	0.001
10.80	0.031	0.007 *	11.00	0.031	0.015
11.20	0.048	0.034 *	11.40	0.048	0.056
11.60	0.212	0.316 *	11.80	0.377	1.067
12.00	0.377	1.827 *	12.20	0.071	1.236
12.40	0.071	0.943 *	12.60	0.054	0.885
12.80	0.037	0.777 *	13.00	0.037	0.715
13.20	0.027	0.630 *	13.40	0.027	0.560
13.60	0.024	0.487 *	13.80	0.021	0.406
14.00	0.021	0.337 *	14.20	0.015	0.265

time (hr.)	rainfall (in.)	hydrograph (cfs)	time (hr.)	rainfall (in.)	hydrograph (cfs)
14.40	0.015	0.232 *	14.60	0.015	0.214
14.80	0.015	0.202 *	15.00	0.015	0.193
15.20	0.015	0.187 *	15.40	0.015	0.183
15.60	0.015	0.180 *	15.80	0.015	0.179
16.00	0.015	0.178 *	16.20	0.009	0.152
16.40	0.009	0.137 *	16.60	0.009	0.132
16.80	0.009	0.127 *	17.00	0.009	0.122
17.20	0.009	0.119 *	17.40	0.009	0.116
17.60	0.009	0.113 *	17.80	0.009	0.111
18.00	0.009	0.110 *	18.20	0.009	0.110
18.40	0.009	0.110 *	18.60	0.009	0.110
18.80	0.009	0.110 *	19.00	0.009	0.111
19.20	0.009	0.111 *	19.40	0.009	0.111
19.60	0.009	0.111 *	19.80	0.009	0.112
20.00	0.009	0.112 *	20.20	0.006	0.098
20.40	0.006	0.091 *	20.60	0.006	0.088
20.80	0.006	0.085 *	21.00	0.006	0.083
21.20	0.006	0.081 *	21.40	0.006	0.079

time	rainfall	hydrograph	time	rainfall	hydrograph
(hr.)	(in.)	(cfs)	(hr.)	(in.)	(cfs)
21.60	0.006	0.078 *	21.80	0.006	0.077
22.00	0.006	0.076 *	22.20	0.006	0.076
22.40	0.006	0.076 *	22.60	0.006	0.076
22.80	0.006	0.076 *	23.00	0.006	0.076
23.20	0.006	0.076 *	23.40	0.006	0.076
23.60	0.006	0.076 *	23.80	0.006	0.077
24.00	0.006	0.077 *	24.20	0.000	0.048
24.40	0.000	0.032 *	24.60	0.000	0.026
24.80	0.000	0.020 *	25.00	0.000	0.015
25.20	0.000	0.011 *	25.40	0.000	0.007
25.60	0.000	0.005 *	25.80	0.000	0.002
26.00	0.000	0.001 *	26.20	0.000	0.000
26.40	0.000	0.000 *			

Rockland Mine

Appendix H

Computed Channel Design Dimensions

STORM -- Version 6.21

General Channel Design

| Title Ephermal Channal |

| Channel Type.....= Triangle |

| Channel Report

| First Side Slope 3.000

| Second Side Slope 3.000

| Flow depth (ft).....= 0.27

| Bed Slope 0.500

| Manning"s n 0.032

| Discharge 1.83

| CFS.....= 1.83

| Cross section area (sqft)..= 0.22

| Hydrualic radius.....= 0.13

| fps.....= 8.36

| Froude number.....= 4.118

Rockland Mine

Appendix I

Surety Bond Documents

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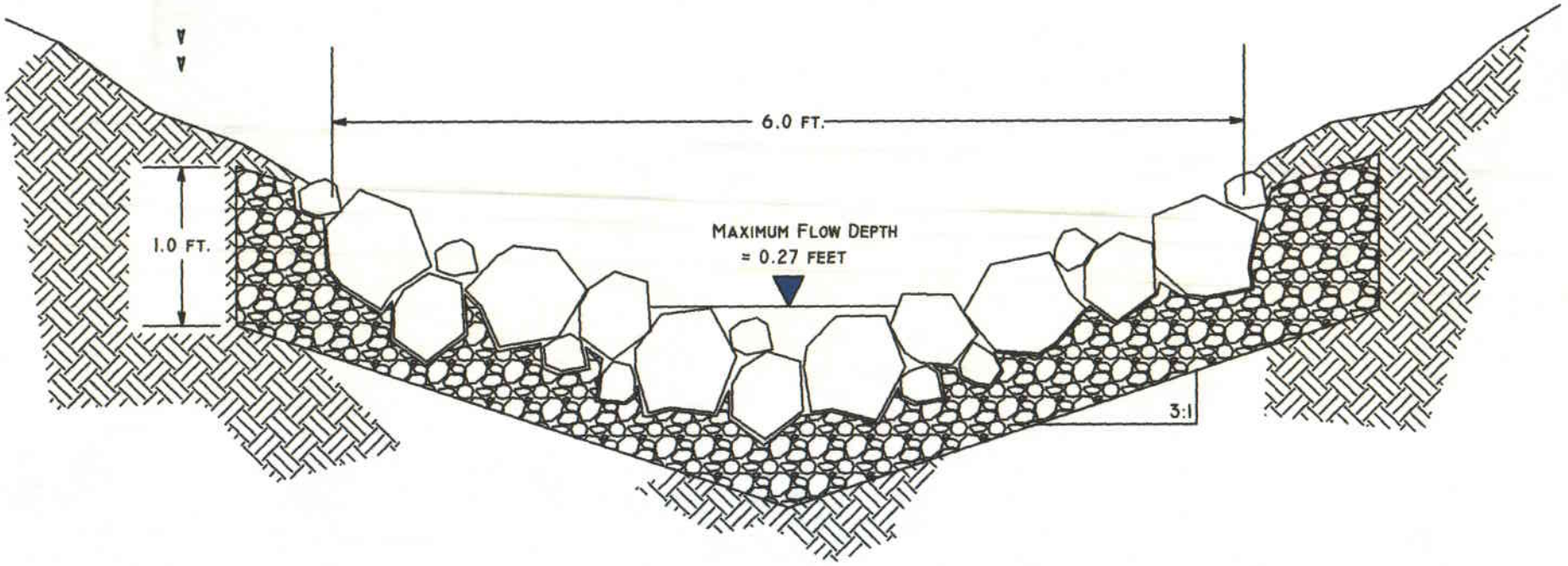
Rockland Mine

Figures Section

Add Figure 110.2E

CHANNEL DESIGN CROSS-SECTION



NOTE:

FILTER MATERIAL CONSISTS OF 1" MINUS WASHED GRAVEL

RIPRAP MATERIAL CONSISTS OF ANGULAR ROCK MATERIAL OF 4-8 INCH

FREE BOARD EQUALS 8.4 INCHES

TOP WIDTH CAN BE REDUCED TO 3.0 FEET AND RETAIN ADEQUATE FREE BOARD

MIRACLE ROCK MINING & RESEARCH
ROCKLAND MINE

TYPICAL CROSS-SECTION
CHANNEL DESIGN 100YR/24HR EVENT

D. OAKLEY	FIG. 110.2-E
NONE	
5/15/2008	SHEET NO.: 1 OF 1

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R647-4-106: Operation Plan

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commences at the Rockland Mine, these materials (rock, subsoil, topsoil) will be utilized for backfilling the highwall. Special placement sequences of these materials are addressed in the Reclamation Plan. Refer to Section R647-4-110.5 Soil Redistribution and Revegetation prior to moving these materials.

R647-4-106.7 Vegetation

The Rockland Mine disturbed area covers approximately 5.82 acres. Prior to disturbance, the native vegetation of the mine and surrounding area consisted of trees, shrubs and grasses. Tree varieties consist of pinions (*Pinus edulis*) and Utah junipers (*Juniperus osteosperma*). A diverse shrub community exists in the area with the major types being black sagebrush (*Artemisia nova*), shadscale (*Atriplex confertifolia*), fourwing saltbrush (*A. canesens*), and galleta (*Hilaria jamesii*). Grasses typical of the area include salina wildrye (*Leymus salinus*), and Indian ricegrass (*Oryzopsis hymenoides*).

A vegetation survey was conducted on an undisturbed area adjacent to the mine site. Twenty transects were evaluated using an ocular method (line intercept method) for estimating percent cover by type. Types recorded are living cover, litter, rock cover, and bare ground. Living cover is broken into two components; understory and canopy cover.

Results of the survey found an understory cover of only 2.7% and canopy of 24.3%. Canopy consisted of pinyon pine and Utah juniper cover. Litter averaged only 1% of the total cover, while no rock or rock fragments were found in the study area. Bare ground averaged 63% of the total area. A spreadsheet of the vegetation survey is found in Appendix E. Based on the results of the vegetation survey, revegetation must achieve a success standard of 70% of the pre-mining vegetative ground cover or ~~19.6%~~ 18.9%.

R647-4-106.8 Geology

As mentioned above, the Rockland is located stratigraphically in the Upper Cretaceous Ferron Sandstone Member of the Mancos Shale. The topographic setting consists of massive beds of very fine- to fine-grained sandstone, carbonaceous shale, coal, mudstone, and siltstone. Outcrops of the Ferron Aquifer exist near the area of the Rockland Mine. The potentiometric surface of the aquifer, however, indicates that recharge comes from the Wasatch Plateau to the west (UGS Bulletin #132, 2003).

The mine site lies approximately 500 feet above the Quitchupah and Muddy Creek drainages. These deep drainage systems form the boundary of the outcropping aquifer. No ground water wells exist in the area. The surface drainage system of the Rockland Mine area is confined exclusively to the Muddy Creek drainage system. Any precipitation that falls on the mine site reports to ephemeral drainages and eventually to this system.

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Disturbed Area 1 (DA-1)

The mine pad area consists of hydrologic area DA-1. Its size is approximately 3.4 acres. All flow is confined to the pad and impoundment area. Any precipitation that falls onto the mine pad either puddles or flows as indicated by the flow lines on Map R107-1A. Runoff volumes have been calculated for the pad area using a 10 year/24 hour precipitation event of 1.51 inches. Peak discharge from the pad is 0.15 ac/ft.

Disturbed Area 2 (DA-2)

The area below the mine pad where material has been cast off the side slope consists of the hydrologic area DA-2. The material consists mainly of pebble to boulder sized rock and is highly permeable. No erosional effects have been indicated on the surface of these slopes. BMP's will not be used at the toe of the slope until final reclamation.

Undisturbed Drainage (UD-1)

Flow from the mine pad flows into the impoundment located on the east side of the pad. Discharge from the impoundment is treated before flowing into UD-1. Drainage UD-1 drains into an un-named ephemeral drainage which eventually flows into the Muddy River.

Undisturbed Drainage (UD-2)

Overland flows (if any) from the mine pad slopes drain into UD-2. This undisturbed drainage flows directly into the Muddy River drainage system.

Undisturbed Diversion (UD-3)

Ditch UD-3 is a historic diversion ditch that was cut with a bulldozer along an existing road above the mine site. This ditch diverts undisturbed runoff away from the topsoil storage area and directs flow into a natural drainage system. The natural drainage, like others in the area, are ephemeral and flow as a result of precipitation events.

R547-4-107.3 Erosion Control

Sediment control measures have been implemented on the disturbed area to minimize additional contributions of sediment solids to the receiving drainage. Best management practices are used to control erosion and sedimentation from mining operations. BMP's include some of the following controls; berms, impoundments (refer to photos), straw bales, silt fences, etc. Surface water quality will be protected by handling earth materials and runoff in a manner that minimizes the potential for pollution. Locations of sediment control practices are shown on the Drainage Control Map (Map R107-1A) in the Maps Section. Specifications for BMP installation are detailed in the tabbed BMP Section.

The Rockland Mine has submitted a Notice of Intent (NOI) to the Division of Water Quality to comply with the requirements of the Clean Water Act. This NOI permits the site to discharge storm water associated with their industrial activity into the waters of the United States. As part of this permit, a Storm Water Pollution Prevention Plan (SWPPP) has been developed for the site. ~~Since the mine site is rarely occupied, the SWPPP is kept at the Miracle Rock Mining and~~

~~Research offices located at 400 South 200 East, Emery, Utah.~~ Refer to Appendix F for review of this plan.

Analysis of the stored overburden samples tested has shown that toxic materials are present on-site (refer to Appendix D for soil sample results). Discharges if any, of water from areas disturbed by mining and reclamation operations will be made in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for mineral mining promulgated by the EPA set forth in 40CFR Part 434.

R647-4-107.4 Deleterious Materials

All deleterious or potentially deleterious materials shall be safely removed from the site or kept in an isolated condition such that adverse environmental effects are eliminated or controlled. Best management practices (BMP's) will be used to minimize contact of materials with rainfall and runoff. BMP's may be structural or non-structural controls that reduce or eliminate pollutants in storm water runoff.

R647-4-107.5 Soils

As mentioned above, soils, including topsoil and subsoil, are removed, segregated, and stored in a stable condition so that they may be used for reclamation. Storage locations are identified on the Surface Facilities Map (Map R106-1A) in the Maps Section.

R647-4-107.6 Concurrent Reclamation

Occasionally, during operations, disturbed areas may be reclaimed when no longer needed. All areas which have been disturbed but are not routinely or currently utilized will be kept in a safe and environmentally stable condition. Contemporaneous reclamation will comply with the plans outlined in R647-4-110 and R647-4-111. As these areas are reclaimed, the area reclaimed will be outlined on a map and reported to the Division.

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R647-4-109: Impact Assessment

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overburden is eight to 12 feet of mineral product. Highwall failure has not been a problem in the past because no groundwater exists in the area of mining and the rock mass of the overburden is structurally sound.

Rockfall problems have been managed utilizing scaling method to remove potential fall areas. Scaling is conducted immediately after blasting activities and the removal of the overburden. Scaling is completed using track-hoe bucket removing all loose rock material. No undercutting of the mineral product will occur. In the occurrence highwall stability becomes a problem, slope geometry modification and/or benching methods may be necessary. Approval by the Division will be required prior utilizing methods other than scaling.

Erosion

Erosion and sediment control practices have been previously addressed in R647-4-107 Operation Practices. A Storm Water Pollution Prevention Plan (SWPPP) as required by the Division of Water Quality is maintained at the owner's main office in Emery, Utah. A copy of this document is also found in Appendix F.

Air Quality

Impacts to air quality resources due to mining and reclamation operations are considered temporary. Emissions realized on the mine site are from equipment, blasting, loading and hauling operations. There are no permitting requirements required by the Division of Air Quality for this mining operation.

Public Safety

Public safety issues have been addressed at the Rockland Mine. There is only one access road into the mine site from Emery County Road 915. The mine entrance has been gated and is locked when idled to prevent public access into the mine site. A sign identifying the phrase, "NO TRESSPASSING" is installed on the locked gate.

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R647-4-110: Reclamation Plan

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Impoundment Removal

One impoundment exists within the disturbed area of the site. This impoundment is located mid-way and along the south side of the access road. The impoundment measures approximately 15 feet in diameter by 3 feet deep. This impoundment has been constructed to treat runoff from the mine pad area and a portion of the access road area. During road reclamation, the impoundment will be reclaimed to compliment the topography of the surrounding area. The contour of the regraded area will be identical to the adjacent undisturbed area.

Drainage from the impoundment was routed along the side of the road to a natural drainage approximately 700 feet away. This area will be reclaimed as part of the road reclamation and no other drainage will be constructed.

Erosion control will be provided using deep gouging techniques. Deep gouges are constructed to retain moisture, minimize erosion and create and enhance wildlife habitat.

The entire area will be reseeded with the approved seed mix in Table 2.

Drainage and Natural Drainage Development

There are two small natural ephermal drainages that will passes through the disturbed area. The first ~~One~~ drainage passes under the access road near the mine gate and is approximately 20 feet in length. This drainage will be reclaimed by first removing the culvert. The reestablishment of this small section will be constructed to match the upstream and downstream dimensions and will provide adequate drainage through this small area. Since this process only impacts approximately 20 feet of drainage, it will be considered negligible and field fit during reclamation. Refer to Map RM-110-4A for detail.

The second drainage is located above the mine workings. Overland flow concentrates in a small ephemeral channel and is currently diverted around the mine workings to the east and west. At reclamation, flow from this area will be diverted over the constructed fill slope as shown on Map RM-110-4A. The upland drainage area is approximately 4.0 acres. Appendix G illustrates the hydrograph utilizing OSM's STORM runoff modeling program for a 100yr/24hr event of 2.48 inches of precipitation. This software predicted a flow from the upland area of 1.83 cfs. Although a very small amount of flow, the reconstructed fill slope will need protection to reduce or limit the probability of slope failure uncovering potentially toxic fill material.

The channel design feature with the STORM program was utilized to design a triangular channel. As shown in Appendix H, the channel will have side slopes of 3:1 and a depth of approximately 1.0 feet. Actual flow depth from the 100 year storm is approximately 0.27 feet giving a freeboard of nearly 9 inches. Figure 110.2-E illustrates the typical design of the triangular channel which will protect the fill slope from the erosive forces of storm water runoff.

Two other very small ephermal drainages exist above the mine site. These channels can be simply diverted to the east and west of the mine workings into existing natural channels. These diversion ditches are shown as UD-3 and UD-4 on Map RM-110.4A.

As part of the fill design on the south end of the mine workings, a concentrated flow pattern will be developed. Because of the very limited area that intercepts precipitation, there is no need to develop a designed channel for the potential flow. The slope will be protected using riprap in the bottom of the concentration flow area. Riprap (sized to approximately 4-8 inches) will be placed approximately 1 foot deep by approximately 2 feet wide. This will be sufficient to protect the slope from the erosive forces of storm water runoff. The reclaimed slopes will also be pocked to limit overland flow.

~~The other drainage, as mentioned above, will be constructed on the south end of the pad. The length of the channel is approximately 200 feet and the rise is approximately 50 feet equating in a slope of 4H:1V. With a slope this minor, it would not be advantageous for creating a design for this channel; however, the channel will be armored with rock riprap for extra protecting against erosion. Refer to any of the 110 series maps in the Maps Section for review.~~

Portal Backfilling

There are portals that provide access to underground workings of the Rockland Mine. They exist on the north side of the facility near the top of the access road. Refer to Map R106-1A for their locations. Figure 110.2-D illustrates how portals will be sealed and backfilled. Essentially, portals will be backfilled at least 10 feet inby the opening with overburden material. Backfilling will require approximately 63 cubic yard of material to complete. Highwall reclamation, as described above, will cover the backfilled openings completely and eliminate all access to underground workings.

R647-4-110.3 Post Mining Facilities

At the completion of mining and reclamation operations, all facilities, structures, piles, ponds, etc. will be reclaimed as outlined in the reclamation plan. No post mining structures or facilities will be left as part of the post mining land use for the Rockland Mine site.

R647-4-110.4 Acid Forming Material Disposition (Refer to table in Appendix C for segregated soil volume calculations)

The existing subsoil pile is located on the south side of the mine site. This stockpile contains approximately 4,269 cubic yards of material stored for use in reclamation. However, soil samples taken in 2005 and 2007(see analysis in Appendix D) indicate that there are acid forming materials (below pH of 6) in the top 1.0 feet of material on the south end of the pile. The extent of the acid forming materials is undetermined. However, for reclamation planning purposes, 20 feet on the south end of the pile will not be used as subsoil. This material, approximately 890 cubic yards, will be buried at the bottom of the highwall and covered with at least 2 feet of non-acid-forming material.

With the elimination of this acid-forming material from the subsoil balance the final total for usable subsoil equals 3,378 cubic yards. Paste pH tests will be conducted in the field during reclamation to ensure that no acid-forming materials will be used as a top cover. This field examination will also ensure that all suitable materials will be utilized to their fullest extent.

R647-4-110.5 Soil Redistribution and Revegetation

Soil redistribution depths have been calculated utilizing the known soil volumes in Appendix C and dividing by the areas needing covered. The depth of cover for subsoil material will be approximately six inches over all fill slopes as shown in Figure 110.2-C in the Figures Section. Depth of cover for topsoil resources amounts to only 1 inch over fill slopes. Topsoils stored and segregated on-site contain ditritus materials mixed within. This vegetative debris should enhance the quality and structure of this material making it a suitable growth medium.

Soil Redistribution

~~As mentioned in above,~~ Native overburdedn removed to mine the humic shale will be used as initial fill to backfill and eliminate, to the extent possible, all highwall areas. During reclamation, this material will be field analyzed to insure material quality. Material that tests with a pH below 6 or above 9 will be buried with at least 2.0 feet of non-toxic material.

As mentioned in the Operation Plan, "A portion of the subsoils are used to create a safety berm around the perimeter of the mine pad." Prior to redistributing the materials in the subsoil pile, the safety berm will be segregated by storing in a location so as not to interfere with backfilling activities. Over the life of the mining operations, these soils established a vegetative cover. Using these soils as a fill closer to the final surface could help in the establishment of final vegetation.

Dozers will be used to push soil materials in place. Initially, all deleterious material will be used as backfill at the bottom of the highwall areas. Fill material will be excavated from the outslope using a track-hoe and placed on the pad area. A dozer will push this material in place over the deleterious material backfilling the highwall and creating the initial contour. Subsoil segregated and stored on-site as well as the safety berm material will be placed at a depth of 6 inches on top of the fill material.

Boulders that have been stored on-site and used during mining operations will be collected and placed randomly on the reclaimed slope. The boulders will be placed in such a way as to mimic the surrounding undisturbed area and create habitat and shelter for small mammals.

After boulder placement, topsoil will be spread adequately to provide a depth of approximately 1 inch of cover. This will be the final contour. Analysis of subsoil and topsoil can be reviewed in Appendix D.

Utilizing a track-hoe, deep gouges will be randomly placed throughout the grade of the final contour. Deep gouges are constructed to retain moisture, minimize erosion and create and enhance wildlife habitat. Seeding will immediately follow the deep gouging process.

Revegetation

Seeding will take place as contemporaneously as is practical following contouring and deep gouging of the area being reclaimed. The seed mixture will be applied by hand broadcasting or by mechanical means. Because of the roughened nature of the seed bed, it is impossible to hand rake the seed to cover the soil. However, by seeding immediately after roughening, the seeds will settle into the voids of the soil. As the soil settles, seeds will be buried.

The Division of Oil, Gas, and Mining suggested the seed mix outlined in Table 2. This seed mix will be applied to all reclaimed surfaces at a rate of approximately 15 lbs/ac.

Table 2: Seed Mix For Rockland Mine Reclamation

Common Name	*Scientific Name*	*Lbs PLS/Acre*
Gardner Saltbrush	*Atriplex gardneri*	*3*
Shadscale	*Atriplex confertifolia*	*2*
Fourwing Saltbrush	*Atriplex canescens*	*2*
Russian Wild Rye	*Elymus juncea*	*4*
Indian Ricegrass	*Oryzopsis hymenoides*	*3*
Kochia	*Kochia prostrata*	*0.5*
	Total	***14.5***

After the seed is applied, the entire area will be hydromulched with a wood fiber or other acceptable mulch. The mulch will be applied at a rate of 2000 lbs./ac. for cover and protection.

Performance Standards for Vegetative Growth

Revegetation will be considered successful when growth has achieved 70 percent of the pre-mining vegetative ground cover. In the case of the Rockland Mine, success standards will be compared to the adjacent undisturbed areas as detailed by the vegetation survey in Appendix E. Vegetation must establish over a period of three years following the last seeding to be considered successful.

When the above standards have been met, the Division will determine that the revegetation work has been satisfactorily completed within practicable limits and approve release of the applied surety or incremental amount thereof.